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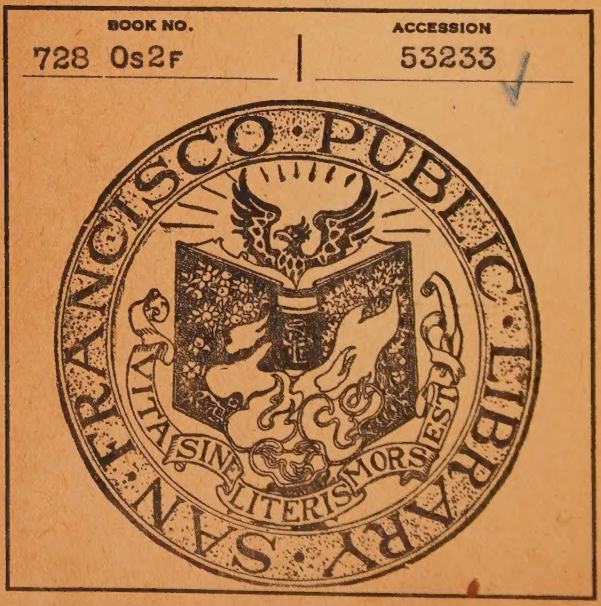

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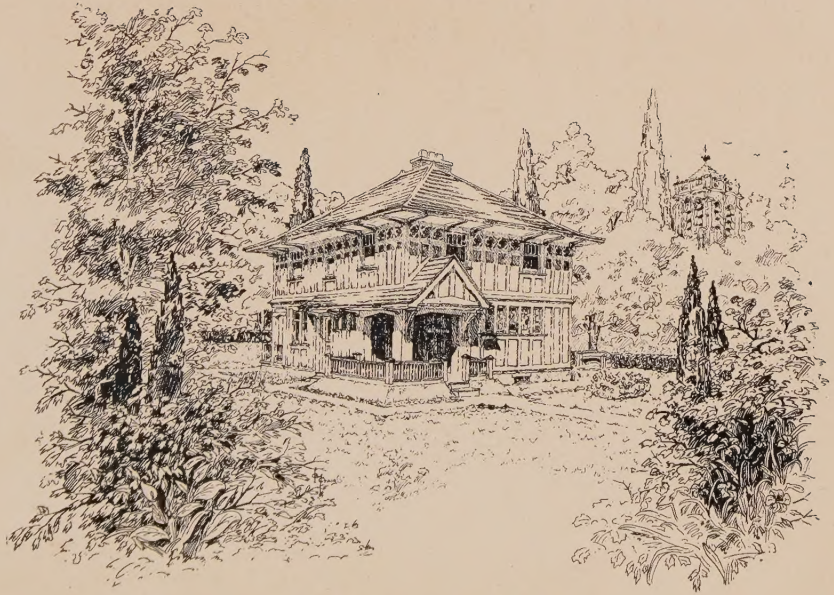

A house of moderate cost

THE FAMILY HOUSE

BY

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CONTENTS

CHAPTER		PAGE
I	Introduction	9
II	House and Home	14
III	Where Shall the House Be?	30
IV	Sunshine and View	47
V	How is the House Built?	56
VI	What is the Plan of the House?	81
VII	The House Refined	127
VIII	Heating and Ventilating	148
IX	Plumbing	175
X	The House and the Garden	188
XI	A Stitch in Time	213
	Index	229

ILLUSTRATIONS

PAGE

A House of Moderate Cost . . . . . *Frontispiece*

Sunshine on North Wall 48

Sunshine on East Wall, June 49

Sunshine on East Wall, December 49

Sunshine on South Wall, June 49

Sunshine on South Wall, December 49

Sunshine on West Wall, June 50

Sunshine on West Wall, December 50

First Floor Plan of a Narrow City House . . . 85

First Floor Plan of an Austrian House 87

Second Floor Plan of an Austrian House . . . 88

Dining Room in the House of the Chaplain to the Grand Duke of Hesse 97

First Floor Plan of a $5000 House 106

Second Floor Plan of a $5000 House 107

Plans of a Good House for a Small City Lot . . 108

Plans of a Narrow Suburban House 115

Ground Floor Plan of a House on a Fifty-foot Lot 119

ILLUSTRATIONS

PAGE

Second Floor Plan, House on a Fifty-foot Lot . . 120

Plan of a Bungalow, First Stage 123

Plan of a Bungalow, Second Stage 124

Two "Art Nouveau" Bedrooms 132

A European Kitchen 180

Treatment of a Small Front Yard 201

Plan for House and Garden on a Narrow City Lot 207

THE FAMILY HOUSE

CHAPTER I

INTRODUCTORY

A good many hundred years have gone by since a wise observer of men and affairs recorded his judgment that "the destruction of the poor is their poverty."

It is worth while to recall this proverb, for it has not lost its force through the lapse of time. Modern social and financial conditions have, on the contrary, extended its application far beyond those of whom it was originally uttered, and its truth is keenly felt by that much larger class in the community who, while not to be regarded as the strictly poor, have yet been reduced by the operations of modern commerce to a condition of almost equal helplessness.

It is to such this book is addressed. Not to the rich (who are well able to take care of themselves, so far as their physical comfort

is concerned) but to those of strictly limited income who, though feeling the increasing pressure of rising prices for all commodities, have still the desire to obtain better things for their households.

To the man of fixed income, the steadily rising cost of the necessaries of life, or (to put it in a different way) the steadily decreasing purchasing power of money, is a matter of the most serious concern. This is not the place to discuss the probable ultimate reasons for this phenomenon, but observation and common sense alike suffice to convince that the advancing prices of foodstuffs, and of most other household necessities are at least partly due to combinations of producers, formed for the purpose of "boosting" prices to the extremest limits the ultimate consumer will endure, and that this artificial rise in prices has been vastly stimulated by the extravagant scale of living adopted by those who are not under the restraint of fixed income or salary.

Physical existence makes two imperative demands: for food, and for protection from the weather. These may only be denied at the cost of life itself. But, as has been pointed out, toward the powerfully capitalized organisms which produce his food, the

man of modest income is reduced to a purely receptive attitude. For the vast majority of consumers, the price and quality of their food are matters over which they have not the slightest control; and about the only privilege left them is that of taking away the goods if they can pay the demanded price.

With that other need of physical existence — shelter — with which this book is more immediately concerned, matters have not yet arrived at such a pass. With houses and clothes, competition is fortunately yet operative and if the buyer does not like one house or one coat, he can usually find another, and often better, at the same price.

But to make our money go as far as possible, we must bargain with intelligence, and it is the purpose of this book to explain the fundamental principles which govern in the domain of housebuilding, and to point out those elements whose presence makes the good and wholesome house and whose absence makes the uneconomical and unwholesome one.

The rising cost of food has forced upon the housekeeper a close study of the situation in that regard, and this study has proved profitable not only through the resulting abil-

ity to buy more closely, but from a more accurate knowledge of the laws of diet it has been possible to secure, without increased cost, a more varied and palatable bill of fare.

In a similar way, a closer study of the principles of housing will not only enable the householder to secure a better house for his money, but through incidental economies (such as lessened fuel cost, and a more wholesome house with corresponding reductions in the doctor's bill) he will be much better off, financially, at the end of the year. The better way opens more quickly to the man who knows.

And not the least of the advantages to be derived from this study of the housing problem, will be the increased pleasure of the home life, through the ability to secure more agreeable and beautiful surroundings.

For, fortunately, capital is not the only source of power. Knowledge, easily acquired, may be skillfully played against competition, and places in the housekeeper's hands about the only legitimate weapon which is available for the man of limited means in his struggle with the well-nigh crushing combinations of capital arrayed against him in his rôle of consumer.

Such knowledge, it cannot be too strongly asserted, enables a man to provide for his family not merely shelter of some kind, but of the kind they need for their physical, mental, and moral advancement.

CHAPTER II

HOUSE AND HOME

A MORE general and determined movement toward house ownership would be made by people of moderate means if the distinction involved in the two words "house" and "home" were more generally felt.

Doubtless it is the desire of all normal men and women to own the house in which, in due time, are to be developed their own lives toward maturity, and those of their children from earliest infancy. But no such development can be regarded as wholly adequate which is not sustained by the endearing memories of home. Yet when you read of "Homes for $2500," or "Buying a Home for the Price of Rent," remember that the words do not bear the meaning they appear to have.

A house is a commercial product, but a home is not. Home is the house plus family life. That home to which one looks back with the most sacred and tender memories in

after years was a compound of both. Every nook and corner of it is vividly associated with some personality or event, and we feel it to have been almost alive and sentient, so harmonious do these relations often seem. We all know how hard it was to leave such a house, and how doubly bitter was the trial when we saw it pass into other and unsympathetic hands, which tore down, rearranged, and "improved" those features which we think of as an absolutely essential part of our earthly existence.

THE HOME AND FAMILY LIFE

Family life, then, being regarded as the essential basis of the home, we may reasonably demand of the house that it shall be adapted to the fundamental characteristics of a definite family. It is only under such conditions that correct development of family character can occur. A house which is so badly arranged or is so deficient in the essentials of orderly living that the natural and proper requirements of the particular family cannot be met, leads to irritation on the part of individual members and the formation of habits of life which fall below the ideal of conduct,

and results in an unnatural and undeveloped existence of the family as a whole. A friend of the author, who was separated from his second wife shortly after their marriage, said that his domestic troubles were mainly due to the faulty arrangements of his house. Circumstances other than financial compelled him to live in a country town where there was little opportunity of choice offered to tenants.

OWNERSHIP VERSUS RENT

Every effort should therefore be made, where one's prospects of employment permit, to build or purchase a house rather than rent one. Salaried people in large cities, while they may never be assured of security in any particular position, are usually warranted in assuming that the field of their future work will be somewhere within the city limits; and this fixity of the field of employment justifies house ownership. For such, it is sometimes regarded as a wiser financial policy to leave a substantial part of the purchase money in the form of a mortgage, as the property is thus acquired more easily and with less risk, and, in an emergency, may be the more easily disposed of.

Theory and experience alike declare that it is economically unsafe for any one of limited means to expend more than one-fifth of his income for rent, or its equivalent. If this ratio is exceeded, some essential of life is necessarily forced below its normal supply, and health, material or moral, suffers. When income declines to the point where only the barest existence is possible, the ratio must necessarily be even lower than one-fifth; though in congested quarters of the city where the worker must live near his work, it is difficult to maintain the safe ratio. Yet, by some means or other it must be done, or disaster in the future is inevitable.[1]

[1] In a recent number of *The Bulletin* (Philadelphia), a query appeared in the correspondence column asking for advice as to the best way of living for a young married couple whose income was eight dollars a week. The following reply was printed:

HOUSEKEEPING ON $8 A WEEK

To the Editor of "The Bulletin."

Sir: If I were "M. P. W." this is what I would do. I would rent a large room for about $4 a month. I would lay $1 aside each week for rent, then I would buy bed and necessary bedding, a small table, two chairs and stove, and pay so much a week on furniture, say, $1. Five dollars for table, $1 for coal and insurance. Of course, if there is any sickness or medicine needed, take a little off of everything else to pay for that. This seems rather little to do on, but where there is a will there is a way. I did it. I am married twelve years, have four children and a comfortable home and pay for all I get and am willing to earn a dollar or two by

THE BUILDING ASSOCIATION

If one desires to purchase a house, it can be done in several ways; but to put any of them into operation it is essential that some cash reserve shall have been accumulated to begin with. If a cash payment can be made of part of the purchase price, the property can usually be mortgaged to an amount sufficient to cover the balance; the interest on the mortgage being about equivalent in amount to a fair rental value of the property. If one is so fortunate as to live within a territory covered by the operations of a local "building and loan society," he will find that no more satisfactory method of house purchasing for the man of limited means has ever been devised.

The way in which such a society operates can be best illustrated by a concrete example. Let us suppose B wishes to purchase a house that is offered for sale at three thousand dollars. Some cash in hand is required by the society as an evidence of good faith and responsibility. Assuming that B has six hun-

sewing or washing and ironing. I never got over $10 or $12 a week, and have got as little as $6 a week. We never spend money foolishly, for we do not have it to spend.
J. L. R.

dred dollars to apply on his purchase, there is a balance of twenty-four hundred dollars to be borrowed. This amount the society will lend him, after having assured itself, through its officers, of B's good character, his prospects of a steady income, and of the adequate value of the property on which the loan is desired. To repay this loan, B purchases (say) twelve "shares" in the society on which he pays "dues" of one dollar per month per share; and he pays in addition one dollar per month interest; this latter being computed at six per cent. This makes a total payment of twenty-four dollars per month, or two hundred and eighty-eight dollars per year. These payments continue until each "share" has, through the profits of the society, acquired a value of two hundred dollars. When this occurs, the shares are regarded as having matured. Since the average profits of such societies when well conducted are about eight per cent. per year, it usually takes about eleven and one-half years for such shares to mature. It will be seen, then, that B has paid, for his original loan of twenty-four hundred dollars, the sum of thirty-three hundred and twelve dollars; but having had eleven and one-half years in which to pay it, he has felt no more

burden than if he had paid rent during that time, and at the end of the period the house is his own. Many hundreds of house owners have become such through the operation of these beneficial societies, which are purely mutual in their method of operation, and when carefully conducted have shown an exceedingly small percentage of loss.

One word of caution seems advisable. Contrary to the operation of the general laws which apply to mercantile corporations, those building and loan associations are most secure which are limited in their scope by being purely local in their organization and field of operations. This is because the real estate field in which they operate is well known to the officers of the society; and with the character and prospects of those applying for shares they are equally well acquainted.[1]

THE HOUSE TO FIT THE FAMILY

But whether one buys or rents every effort should be made to the end that the house, in its variable factors, conforms as closely as

[1] Several attempts (one or two possibly in good faith) have been made to organize such a society on a state or national basis, but complete disaster has resulted in every case, so far as is known to the writer.

possible to one's ideals and habits of life. A house is something more than walls and roof; windows and doors; floors and ceilings. There is position, or site; interior arrangement, or plan; there are questions of the materials of which it is built, of neighborhood; of accessibility, of rental and cost of maintenance, and kindred others. These require careful and intelligent consideration; and the following chapters deal specifically with such, in order that the renter or purchaser may secure from the field of competition between the real estate operators the best advantages which his means can secure. But bargaining in this field inures to the buyer's advantage in exact proportion to his acquaintance with the elements of value in the transaction.

There is always, therefore, some choice for the renter as to neighborhood; some preference to be exercised on sanitary grounds; some balancing of advantages, from his own point of view, of the relative merits of two otherwise equally available houses. If the plan of the house be found in some details unsuitable, it may often be mitigated and improved wholly or partially with the landlord's coöperation, especially if the house be taken on long lease. Colors on the walls and of

fabrics for the hangings may be selected at will, and the furniture gradually, if not immediately, be brought into some sort of harmony with one's ideas of suitability and comfort. So that even about a rented house there may be created by intelligent effort some atmosphere and sentiment of home, even though the exterior be preposterous or ugly, or the plan in minor respects absurd.

It is especially unfortunate that the vast majority of rentable houses have been "built for the market," and built, too,— one cannot say designed — by men whose temperament and previous habits of life unfit them for a comprehension of the point of view of refined and discriminating tenants of limited means. At no more expense such houses could have been made agreeable and comfortable instead of inadequate and absurd. But of this, more in detail in another chapter.

THE RICH MAN'S TROUBLES

The poor man may console himself that the larger houses of the rich are a severe burden from an administrative point of view. One very rich man has recently incorporated

his house, thereby placing its complex administration on an exact, stable, and impersonal commercial basis. Another, recently deceased, closed his really magnificent house in the suburbs of a large city and took rooms for himself and his wife — his children were all married and scattered — in a by no means commodious apartment house in the heart of the city. His response to the openly expressed surprise of his less experienced friends throws a flood of light on the domestic burdens of the rich. He said, "I am tired of keeping a negro hotel." His large staff of house servants were all colored, and the disproportion between the troublesome detail of their maintenance and that of himself and his wife had finally struck him as ridiculous and further unendurable.

Home life cannot, obviously, be developed in a rented apartment house, still less in a hotel, as a recent notable and pathetic case has illustrated, and as for the homeless rich of the newer type, whose domestic troubles are becoming a public scandal, there can be little doubt that the disintegration of family life, which afflicts and characterizes them as a class, is as largely due to the impossibility for them

of home life, under the exactions of modern fashionable society, as to any one other single cause.

Some mitigation of the disadvantages of life in an apartment has been brought about in New York, where it is now possible to purchase single apartments. This scheme has been devised as a compromise between the rented apartment and the suburban home, since physical conditions in New York make house ownership increasingly difficult, even for people of relatively comfortable income.

BUY CAREFULLY

There is a fundamental rule to which strict attention should be paid in every step connected with the development of the home. By so doing not only will satisfaction be produced in all that relates to utility and economy, but it will also have another most agreeable result, and that is that the home which develops under such conditions will bear the unmistakable impress of the owner's individuality. For men of moderate means, who may feel warranted in the expense of building a house, attention must of course be paid to the commercial side of the question. That is to say,

to the possible necessity of, at some time in the future, disposing of the property without too much, if any, financial sacrifice. If the site of the house has been judiciously selected as suggested in a succeeding chapter, the house itself honestly built of sound materials rather than for the purpose of superficial display, the value of such a house property should continually even though slowly increase; but in developing the principal of individualism as applied to houses one must be careful to keep the commercial aspect of the case carefully in mind. For while a man of ample means would be entirely justified in proceeding to any extreme in departure from commonly accepted precedent in the arrangement or decoration of his home, those less fortunately situated must be cautious not to carry this so far that the house will not appeal to anyone else. Much difficulty might be encountered in its sale or rental should this ever be necessary. Yet it is entirely possible, within the limits set by average demand, to give every house such a degree of distinction, individuality, and refinement, as would instantly appeal to inquiring tenants or purchasers. In this way houses would possess a real charm which would markedly enhance their market value.

INDIVIDUALITY

The writer was invited not long ago, while about to start out for a walk in the country, to inspect a friend's house then nearing completion and almost ready for occupancy. The locality was an unfamiliar one and the exterior of the house, so far as its type was concerned, was one to be met with pretty generally. On reaching the indicated place three or four houses in about the same advanced stage of completion were found and it seemed for a moment as if there might be some difficulty in determining just which house was the object of the search. In walking by the new houses however one attracted instant attention because it showed even on casual examination, certain fine qualities related rather to delicacy of detail and careful study of proportions than to distinction of type. This made it absolutely certain that the house showing these qualities was the one sought for because they were qualities which distinguished the man for whom the house was built. Subsequently it appeared that the correct house had been picked out. It ought to give the highest degree of satisfaction to every houseowner that his character and taste

are very visibly expressed even in the exterior of his dwelling place. The house referred to above was a small one and inexpensive,—but its characteristics were unmistakable.

LOOK FOR CONVENIENCE, NOT SIZE

There is one principle related to the subject-matter of this chapter which is so fundamental in its character that it is necessary to call the reader's attention to it at the outset of his study of the entire problem. From every point of view it will always be found far more satisfactory to bend all one's efforts towards securing a smaller but well equipped and conveniently arranged house rather than one which, though larger in its accommodation is but meager in its appointments. The family will derive much satisfaction from a house, even though its plan may necessitate some slight crowding, if it contain all of the essential conveniences of a larger house, while, on the other hand, if these be lacking, no amount of mere floor space can compensate for the many irritations which will hourly arise when the house lacks its proper equipment.

The fault of most small houses is that they

ape the plan arrangement of the large house when every consideration of economy makes it impossible to use such a plan in the way that the large house implies. Small houses have, or should have, characteristic plans of their own. Small drafty halls, for example, with a travesty of a fireplace are absurd; but if there be a few large rooms, each of which has a distinct use, from every point of view they will afford greater satisfaction than will a greater number of smaller rooms, the distinction between which is purely artificial and not justified by the actual social habits of the family occupying the small house.

If the occupants of small modern houses would face the real facts of existence and determine to so build or rearrange them as to meet those facts, the whole problem would be solved and the caution just given would be unnecessary. But tradition is so powerful, that nine men out of ten will "go along" and wonder why the house is so uncomfortable.

All of the problems connected with the building and the use of a house would be properly solved, if we always made it a fixed rule to first determine frankly and accurately what particular need has to be met, and then

meet it with equal frankness. One should, however, always make sure, before a final decision is reached, that every side of the problem has been considered.

In a word — sincerity of purpose throughout the entire problem, not only in planning but in construction and decoration as well, is the key to success. Proceeding in any other direction will result in dissatisfaction or even actual disaster.

CHAPTER III

WHERE SHALL THE HOUSE BE?

WHERE the wage earner or salaried man may live will always be largely determined by local and often accidental circumstance, and freedom of choice in this matter will vary directly with the ratio of excess of receipts over expenditures. For the city worker, when any choice can be exercised, the question whether he may occupy an urban or a suburban house will usually be answered on the ground of individual preference. If the latter choice is made, there are sure to be half a dozen suburban towns, widely separated from each other and offering very diverse attractions, yet in equal relation as to time and cost of transportation to the office. The certainty of congenial social surroundings; some aspect of rural life especially appealing to the individual taste; possibly even the relatively greater convenience of one terminal station over another or the relative frequency of suburban train service — on some

such ground the choice is usually made. Yet with these more or less sentimental considerations we are not wholly concerned. It is rather the question of "site" in its technical, restricted, and physical sense that occupies us.

THE SITE

In considering the site of the suburban house the following points which affect residential values should be given the most careful attention:

1. Transportation facilities between the district in which the proposed house is situated and the office.

2. Relation of the house itself to the railway station or trolley lines.

3. General character of the neighborhood in which the house is situated, and the general relation of this to the nearest manufacturing district, if any.

4. Character of the traffic on railway and trolley lines, if nearby.

5. Condition of the street or highway on which the home is located.

6. Physical condition of the lot on which the house is built; noting also that of adjoining lots.

DISTANCE FROM WORK

Forty-five minutes from the house to the office is the extremest limit to which the suburban commuter can afford to stretch the daily tax upon his time and physical energy, so far as the transportation question is concerned. Thirty minutes is far more reasonable, and should be regarded as the allowable mean. Only exceptional advantages of a compensating nature should induce him to exceed it. Some distinction may indeed be made in favor of comfortable and wholesome transportation in a suburban steam or electric train of clean cars and ample train capacity as against the crowded, dirty, and ill ventilated cars of the usual type of urban trolley service. Forty minutes in the former will be far less fatiguing as a daily experience than half that time spent in the latter, with the added safeguard from exposure to contagious disease to which every rider in the urban car is constantly subjected. Yet, forty-five minutes between the house and the office diminishes the available time for rest and recreation at home which, under modern business conditions, is being constantly reduced below what must be regarded as safe limits.

Frequently there will be some choice of transportation service to town, and the relative merits of these and their several relations to any house under consideration should not be overlooked.

THE TRANSPORTATION PROBLEM

The facilities of getting easily and quickly from the house to the point where the train or trolley is taken is important. The trip to and fro will be made twice daily for every working day in the year and under all possible conditions of weather. What may seem, with reference to a single trip, some minor advantage of sheltered walk, or slightly lessened distance, becomes of much importance when the year's journeys are taken into account. Even a short walk along a bleak highway exposed to the full sweep of the winter's gale or the hottest downpour of the midsummer sun, becomes justly magnified into a serious fault in its relation to some otherwise desirable house. If there are children in the family, their walks to and from school must also enter into the problem.

As between houses at differing distances from town there is not only to be considered

the relative difference in the cost of transportation, but also the fact that the seating capacity of suburban trolley service is not always carefully estimated for the nearer residential districts, and the further out one lives the more certainty there is of always getting a comfortable seat into town in the morning, and for most of the distance out in the evening. As between different suburban districts, consideration should be given to the relative records of the several transportation companies for keeping their lines open in winter storms, or regularity of service at all times of the year and, of course as to convenient hours of service.

NEIGHBORHOOD

In determining the availability of any house under consideration, the general character of the neighborhood would be justly regarded of the first importance. This is easily determined by inspection, and well kept grounds and houses, however modest in scale, and well kept streets, should be deemed an indispensable accompaniment of the new home. One must not forget, though, that these very desirable accompaniments may, and often do, mean that

the neighborhood is a growing one. This is most certainly indicated by any unusual number of new houses going up, and new streets being laid out. The disadvantage of this state of affairs is that rents are certain to rise year by year, and such a locality, however charming, is a better place to buy or build in than to rent in. But the availability of any residential neighborhood is not finally determined by its immediate surroundings. Some other neighborhood, seemingly remote, may, under certain conditions (of weather, for example) be brought into an immediate and very detrimental relation to an otherwise seemingly desirable part of the town. Manufacturing establishments, even at some little distance, may, under certain conditions of wind or temperature, overwhelm the residential quarter of the district with soot-laden smoke, noxious and ill-smelling fumes, or even the noise of their operations — especially if night shifts are working. Detrimental elements of this nature can only be certainly determined by repeated inspection of the property under consideration at various times of the day, days of the week, or states of the weather. Such a minute examination is not always possible. One must depend on the

testimony of former occupants of the house if available, or of actual residents; though these latter, being anxious to dispose of their property, will probably try to evade direct answers to awkward questions. One of the most significant indications is the display of an unusual number of "to rent" or "for sale" signs on the houses in any residential neighborhood. It is usually an unfailing indication of some change of character in the neighborhood, impending or accomplished, which makes the inhabitants anxious to get away.

NEIGHBORS, NOISE, AND SMOKE

Then as to the character of the traffic on nearby railway or trolley lines. In one or two cases which have come under the author's observation, an otherwise attractive residential neighborhood has been rendered quite undesirable by the presence of noisy and even seriously disorderly crowds of excursionists returning late at night and on Sundays from a park or outdoor resort of the cheaper class at some little distance further out the line. Such people will straggle along the road in front of the house on foot, or go by with loud shouts on bicycles, or on the trolley cars.

The entire neighborhood is sure to be disturbed by the disgraceful conduct of these disorderly classes until late at night. This detrimental element is much more serious than might be imagined by those who have never undergone the experience, and is sufficient to absolutely exclude any property subject to the annoyance from further consideration. On railway lines such conduct would not, of course be tolerated, but these may still be the source of a serious annoyance of quite another character. Railway freight is, so far as possible, run at night while the lines are relatively clear from passenger traffic. This in itself is not a source of serious annoyance, except on those roads where skillful and efficient methods of management have not developed, and where the shrill whistle of the freight engine seems an indispensable accompaniment of every movement. In certain stages of the wind, especially of the moisture laden southerly and easterly winds, this incessant whistling may cause annoyance at considerable distances from its point of origin. If the house is near busy railway lines much discomfort may also be caused by clouds of smoke, in which most roads still waste an appreciable amount of their fuel expenditures. The greasy soot

from this smoke will not only pervade the house indoors, but will spread a perceptible pall over lawn and garden, dimming the colors of the flowers, distinctly lowering the vitality of all forms of vegetation, and rendering that form of rural relaxation known as "sitting on the grass" quite out of the question. Where an all night service on a single trolley track is maintained, it is a distinct disadvantage to have a passing point or switch in front of one's house. Such places are always noisy.

WHAT SORT OF A STREET?

The physical condition of the street or highway of whatever kind that lies in front of the house is of importance as an element of value. It should be paved as to its sidewalks, if it have any, or be at least macadamized if a simple country road. If it be the latter, and especially if it be a convenient line of communication between important towns, it is likely to be extensively used by motor cars. In this case it should be treated with tarvia, terracoleo, or some other of the asphaltum compounds to make it dust proof. Otherwise, the garden and the house will be enveloped in clouds of dust all day long during

dry weather. An unpaved country road which may look exceedingly attractive in fine weather will, unless of sandy soil, become little better than a morass in wet weather, both in summer and winter. On such a road, the daily journeys to and from the station, or for the children going and coming from school, become in the highest degree vexatious.

It might be well, too, to make sure that the highway in front of the house is not a portion of a traffic route between a stone quarry, brickyard, or other similar busy place, whose products must be hauled daily and continuously to a market; clouds of dust in dry weather, deep ruts in wet, and incessant noise and clamor will be attendant elements of discomfort.

THE LOT

Turning our attention finally to the lot itself, upon which the house is built, the following points should be carefully considered. Is it lower than the highway or the adjoining lots? This has reference not only to the certainty of washing upon the lot in heavy rain storms from surrounding properties, but to the fact that a relatively low level is an indication of possible underground streams

which may dampen or even overflow the cellar during the winter and spring. The washing of surface soil from adjoining lots will often seriously interfere with the garden arrangements and is always difficult to deal with. During the spring thaws, too, and in heavy rainstorms, puddles will form on the lot in the most inconvenient places, and the paths may be kept in a well-nigh impassable condition. Therefore, no matter how attractive the lot may look during fine weather avoid it if its general grade is below its neighbors. The condition of the fences or other physical boundaries of the lot should receive attention, and the owner required to put them in good order. The walks and paths, both front and rear, should be reviewed for similar treatment, if necessary. If any choice is offered between lots of larger and smaller size, the larger should be chosen if the labor of keeping it in good order will not prove too burdensome either on person or purse. The larger lot gives freer and more abundant air and sunshine about the house, and less obtrusive neighbors, but it must not be forgotten that country "yards" require more attention, relatively, than do those in the city; and this is because more must be attempted in the way

of ornamental gardening in the country than is required in the city, if the house is to look as though it belonged to its surroundings. The general question of the garden will be dealt with in another chapter.

Residential districts which, as a whole, are relatively low lying, are less agreeable and healthful than those occupying higher ground. They are hotter in summer, though perhaps less bleak in winter, but are sure to be damp at all times of the year. Sites in valleys are sometimes cool on summer nights, owing to the prevalence in many such localities of a night downdraught of air flowing from the hillsides to the valley bottom. This is especially likely to be the case if there be a river or lake in the valley. Houses on or near hill tops are not to be recommended as winter residences on account of their excessive exposure but, if well shaded, they will be cooler in summer, spring, and fall, than lower lying sites, especially after sundown. If lying part way up a hillside slope, care must be taken to see that the property does not include wet or swampy places, due to outcroppings of impervious strata. These may take place at the surface, or worse still, against a cellar wall below grade, where the outflow of water can-

not be adequately dealt with except at a very considerable expense. Everyone who knows his countryside is familiar with these hillside swamps and springs.

Sites for houses in the city are subject to more limited consideration from our present point of view. So far as the points bearing on the value of rural sites have application, they are of equal force in the urban districts; but few of them are applicable, owing to the physical restrictions of city sites. Aside from the more sentimental considerations which affect site values in the city, the chief elements of value are mainly determined on purely sanitary grounds. Perhaps the most important element is the following: Vital statistics in New York indicate (what might have been expected on theoretical grounds) that houses on the north side of east-west streets are more healthful than those on the south side; that north-south streets, taken as a class, report fewer cases of sickness than those on east-west streets; and that houses near street corners show a better health record than those occupying the middle of the block. In spite of these facts houses on one side of the street often find takers as easily as those on the other, though this should not be the case.

TOWN, OR COUNTRY?

With regard to the general question of "town, or country," (including in the latter term the less crowded suburban districts), it may be said in conclusion that the determination as to which presents the greater advantage, is, in its last analysis, largely one of individual taste and temperament. In residential country districts, such as are usually possible for the city worker, we are likely to find, in common with the city, paved and lighted streets, good water, gas or electric lighting for the house, and often both. As compared with town, we have purer air, larger yards, with the possibility of an ornamental flower garden, or even of a kitchen garden if one be so inclined; freedom from city noise; and readier access to the purely rural districts for outdoor recreation. In addition to this, if suburban transportation be properly developed we are no further away from the office, in point of time, with more comfortable service. On the other hand, though rents are lower in the country, food and fuel are usually somewhat higher, with the local markets more restricted both in scope and capacity. Much must be bought in town and some of the pur-

chases "personally conducted" to the home. Schools for the children are apt to be less satisfactory in the country, and will be certainly less easy of access. Town amusements are only attainable at the sacrifice of much time and patience. Society is more restricted in its scope, though less formal in its requirements. Church-going and getting about generally in the country are difficult at times, unless one has some sort of conveyance. Taxes are lower in the country, but one has less adequate protection to person and property — a condition frequently giving rise to a good deal of justifiable anxiety. In stormy weather, especially in winter, every member of the family is more restricted in outdoor movement, and the question of exposure becomes, especially for the less robust and for the children, one of serious concern. Medical attendance is often quite as good as in the country, but less quickly available. The servant question is more acute in the country, and is almost certain to be a source of continual vexation. For the business man himself "the country" means little more than "catching trains," and he really sees little of it except on Sundays and holidays.

As to the general question of the relative

healthfulness of town and country for the city worker, it is doubtful if the countryside, taking all things into consideration, really presents any marked advantage over the city.[1]

MORAL ADVANTAGES

On which side lies the moral advantage seems to the writer also a debatable question. For the younger children, country upbringing is perhaps more wholesome, but as they grow older it is very doubtful if such a conclusion is warranted. Rural simplicity and innocence are largely a product of the imagination of those who only know the countryside in its superficial aspects as summer visitors. Opportunity for the viciously disposed is, in one form or another, ready to hand in either environment, and the trend of thought of the younger set among the country bred is, so far as the writer's observation serves, less wholesome and broadening than among similar people in the city. It is certain that for those accustomed to the city's ways since early

[1] The London *Builder* has recently reported the conclusions of one of the health officers of London who seriously questions the advantages of suburban life for city workers, pointing out more especially the damage to the nervous and circulatory systems caused by the incessant travel to and fro.

childhood, there is far greater poise and stability of character when exposed to the opportunity of going wrong, since they have continually been so since they began to observe for themselves.

There is no swifter descent than that of young men who are so easily thrown off their moral balance by the wholly false glamour of the city's temptations when suddenly exposed to them; while those who are city bred have long since learned to estimate such things as they really are. Nevertheless, the attraction of the countryside will prove irresistible to many discriminating men and women, and their response to such a call can after all only be regarded as the sign of a wholesome nature. There are undeniable rural attractions, and if one adopts the proper attitude toward country life, taking it for what it is and striving to understand it and get the best out of it, by resisting its narrowing tendencies, perhaps no one is justified in saying that, for this or that individual or family, life in the city is preferable to life in the country.

CHAPTER IV

SUNSHINE AND VIEW

FRESH air and sunshine are the necessary accompaniments of the wholesome house. Let us see how they may be best attained under practical conditions.

For the country house, standing free and detached on all sides, fresh air and sunshine are natural adjuncts. It is only when one's lot is restricted in size and hemmed in by overshadowing neighbors, that knowledge of fundamental principles of hygiene, and skill in applying such knowledge to the particular case in hand become of really vital importance.

PROSPECT AND ASPECT

There are two technical terms used to classify the qualities inherent in all forms of the exposure of the house to its surroundings. These terms are "prospect," and "aspect." *Prospect* has to do with the relations of the house to surrounding terrestial objects, far or

near; while *aspect* concerns itself with the exposure of the house to the sunshine and the weather conditions which prevail in any particular locality under consideration. When surrounding objects are natural and remote, the question usually resolves itself into one of view which, though a sentimental consideration, has a marked influence on property values. Of a similar nature are clumps of trees, springs, and picturesque features generally, or, it may be, those of a more utilitarian nature, but all elements of value. With objects nearer at hand, the question must sometimes be considered from a different point of view, an estimate being made of the detrimental effect upon the house of the proximity of such objects. If a stable, for example, immediately adjoins the lot on one side, means must be taken to minimize its objectionable effects by planting out, or by so arranging the relative positions of the house and garden that the house will be as far removed as possible, or by some other suitable means.

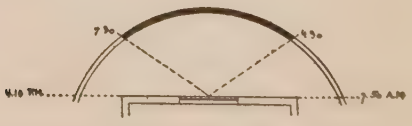

Fig. 1. North Wall, June 21.

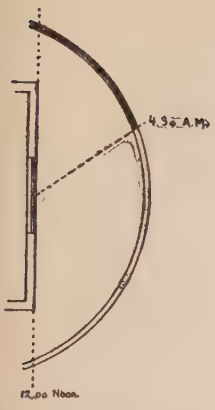

Fig. 2. East Wall, June 21

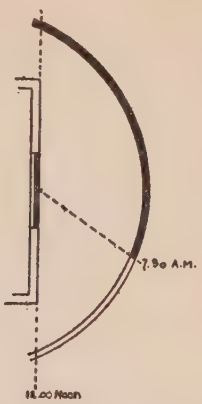

Fig. 3. East Wall, Dec. 21.

Fig. 4. South Wall, June 21, 8⅔ hours.

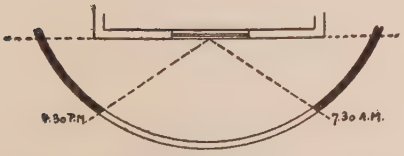

Fig. 5. South Wall, Dec. 21, 9 hours.

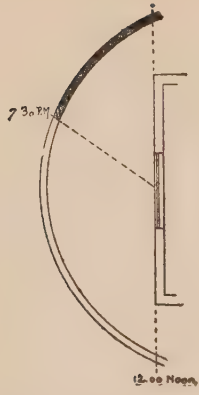

Fig. 6. West Wall, June 21, 7½ hours.

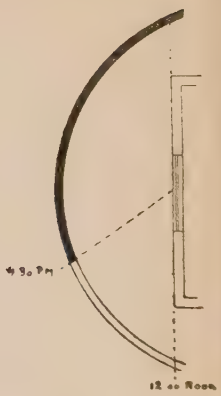

Fig. 7. West Wall, Dec. 21, 4½ hours.

We have already seen that distant manufacturing establishments or railways, or a much traveled highway in front of the house, may prove objectionable under certain conditions. To all of such conditions with which prospect has to do, due regard must be paid if the fullest possible value of the site is to be realized. Examples of the best treatment in particular cases will be shown hereafter.

THE AMOUNT OF SUNSHINE

With the question of sunshine, and of weather conditions generally, we must proceed

on different lines. Let us first consider the relative exposure to sunshine of the four walls of a house with reference to the four cardinal points of the compass. Diagrams will help us here to a quicker appreciation of this point.

Figures 1 to 7 show the four walls of a house which face the four cardinal points — north, east, south, and west. Relative to these walls are drawn "sunshine arcs" which show at a glance how long is the period, for each wall, during which the sun shines directly upon the wall at different seasons of the year. These are, the summer solstice on the 21st of June; the winter solstice on the 21st of December; and the vernal and autumnal equinoxes on the 21st of March and September respectively. For the north wall of the house, only the duration of sunshine for the 21st of June is shown. The total amount on that, the longest, summer's day, is six hours and forty minutes, divided into two equal periods of sunrise and sunset. As the rays fall very obliquely on the wall both in the morning and afternoon periods their hygienic value is greatly lessened as compared with the other walls. From the 21st of September to the 21st of the following March the north wall will receive no sunshine whatever. On the longest

day in summer the east wall is exposed to the sun for seven and one-half hours.[1]

On the shortest day of winter the east wall can receive four and one-half hours of sunshine, but this will be somewhat diminished by the mists and fogs of the early winter morning. In summer, the sun will shine upon the south wall for eight hours and forty minutes, and in winter for about an equal period if the entire day be clear. The west wall is exposed to the sun's rays for seven and one-half hours on the 21st of June, but on winter's shortest day this period has been diminished to four and one-half hours.

Before estimating the relative values of these sunshine periods one other element must be taken into consideration, namely, the altitude of the sun at different times of the year. On the 21st of June the sun attains at noon an altitude above the southern horizon of about 74°. At the winter solstice this has been lessened to 24°. The significance for our present purpose of these differences in altitude lies in the fact that in summer, when the sun is hottest, its rays do not penetrate very

[1] The sunlight periods are approximate, disregarding astronomical exactness, and are calculated for latitude 40° N.

far into the south windows of the house, while in winter, when its warmth is most welcome, and when it shines upon the south wall of the house for an even longer period than in summer, it will, under usual conditions of window opening, shine half-way across the floor of the room.

It is this same difference in altitude, again, which makes the western rooms of a house so undesirable in summer; since the low and intensely hot rays of the afternoon sun will penetrate to the remotest corners of all rooms on that side of the house.

THE BEST WAY TO PLACE A HOUSE

If diagrams similar to those previously shown should be drawn for the walls of a house which faced the intermediate points of the compass — that is to say, northeast, southeast, southwest, and northwest — it would be found that a house so placed has several distinct advantages over one in the first position. There will be, for instance, no wall of the house which may not receive direct sunlight during some part of the day on every day of the year, and rooms on the southeast and southwest corners of the house

will receive much more sunshine than is possible for rooms in any other position. A southwest room, for example will receive direct sunshine from sunrise to sunset on the longest day in summer as well as on the shortest day in winter.

During the summer months, the prevailing winds are southerly with a tendency to westerly; and all day rains will come with easterly winds — either southeast or northeast. Northerly and especially northwesterly breezes are rare in summer. In winter the prevailing winds are westerly with a tendency to northerly. Easterly storms in winter are accompanied by rising temperature, but the winds soon shift to northwesterly with rapidly falling temperatures and sometimes with blizzard conditions.

All of these meteorological conditions affect in the most important way the disposition of the house plan, both from a strictly sanitary point of view as well as from that of the relative agreeableness of the rooms on the several sides of the house as they may be assigned to one purpose or another. It can be seen therefore that the question whether the principal rooms of a house face in one direction or another is of decided consequence, and

the relative values of houses or suites of apartments is very materially affected thereby.

The very question of view, also, has an element of distinctly hygienic value on account of the direct influence which it has on most temperaments for good or ill. Lord Bacon has well expressed this idea in his essay "On Building." He says:—"He that builds a fair house upon an ill seat, committeth himself to prison." A bright, cheerful, interesting outlook from the house will very perceptibly affect the spirits of the household, and this inspiration will be daily renewed as new charms are discovered under the myriad changes of light and season, and will count as a powerful factor in maintaining the health of the household, just as an ugly or otherwise irritating view will most surely have a contrary effect.

CHAPTER V

HOW IS THE HOUSE BUILT?

THE question at the head of the chapter refers to the materials of which the house is built and the way they are put together: "materials and workmanship," as the specifications say.

When renting or buying a ready-made house careful inspection is necessary lest we suffer in the one case, positive discomfort, and in the other, heavy expense, should the house prove seriously out of repair after the bargain is closed. To make such inspection effective we must proceed systematically, and the outside of the house should first be carefully examined.

WHAT TO LOOK FOR

Stone walls are likely to have the mortar washed out of the joints, requiring repointing to put them in sound condition. This is an expensive operation if properly done, as each joint must be gone over by hand, the

loose mortar raked out with a steel tool, the surface well wetted, and the new mortar pressed in hard to make a thorough union with the old. As may be imagined, the expense of this operation is chiefly due to the time necessary for its thorough performance, as the workmen must be swung from scaffolds and these gradually lowered as the work proceeds. Cement mortar should always be used for pointing, regardless of the character of that in which the stones were originally laid. Especial attention should be given to the pointing of the stone foundation, especially at or near grade as the ground water rising in the wall at this point is likely to work much havoc.

Brick work, unless very old and much neglected, will not usually require pointing, except about the chimneys, and especially about the tops of these. It should be noticed whether the chimneys lean perceptibly, the direction of such lean being usually toward the northeast, due to the combined action of driving rainstorms and frost. In brick walls the fuel bill in winter for heating may be materially lessened if the window and door frames are carefully caulked with oakum and afterwards joined with cement mortar. Look out especially for gaps under the sills on the

outside. Much leakage of cold air in windy weather takes place around the door and window frames, and this is not an economical method of ventilation.

WHAT CRACKS IN A WALL MEAN

Cracks in the masonry, whether of brick or stone, should be carefully looked for, but only an examination extending over several weeks or months can usually make certain whether the movement is progressive or has stopped. Ready determination of the significance of these cracks may be made by an imaginary line drawn at right angles to the general direction of the cracks. Such lines will point toward that portion of the wall that has settled. For example, if the cracks extend from the center of the wall upward and outward toward the corner the settlement is at or near that corner. On the other hand if the long cracks start at or near the corner and extend upward toward the center of the house it is the central portion of the wall which is settling. Prolonged cracks are usually due to settlement of the foundations. This may be caused by the compression of the earth under the foundation walls or to defective construction of the walls themselves.

Settlement cracks are sometimes due to openings in the wall that have been spanned by weak arches or beams. Such cracks are purely local in character, and may be remedied without much expense by correcting the initial fault. If it can be determined that the movement has ceased, cracked walls may be most cheaply repaired by stopping the cracks with cement mortar in which coarse gravel has been mixed. If the cracks are very large it is better to cut out portions of the wall and insert new bricks or stone, as the case may be. Large cracks are pretty certain to cause internal distortion. Inside plaster walls will of course show cracks, mantels will have gaping joints, doors and windows will not close properly, and floors will be out of level.

If brick walls are built of soft or "salmon" bricks they will be very absorbent and large quantities of moisture will be held in the wall after rain storms. In summer this will cool the house as the water evaporates, though if the rains be prolonged the house will be kept unduly damp and unwholesome, it may be for weeks at a time. In winter this moisture will freeze, causing weakness and sometimes crookedness in the wall. Such absorbent walls may be best cured by treating them with

a waterproof solution, such as "Cabot's Brick Preservative," which is usually effective. It can be applied by any painter and one coat will generally suffice, though it would insure dryness if a second coat were applied two or three years later. These two coats will suffice for many years.

Waterproof solutions are cheaper than paint, and have the great advantage of not affecting the original color or texture of the wall; though walls of unpleasantly light bricks may be darkened by mixing a little red stain with the waterproof solution, care being taken in such case not to aim at uniformity of tone in its application. House painters, unless trained under a good architect, are very apt to regard uniformity of color as absolutely essential, and it will require some trouble on the part of the house owner, to overcome the often stubborn resistance of the painter to the new idea.

CELLAR WINDOWS

Notice the cellar window areas and see if they are in good repair and have some sort of drainage from the bottom. Bricks laid on edge in sand form the best drainage for small

areas unless the soil be clay. For larger areas this method would injuriously affect the basement wall and it will be necessary to have a drain pipe carried off to some small dry cesspool for each of the larger areas. It is of course of prime importance that the earth should not have settled at the grade line about the basement wall, and if it has done so new earth must be supplied to bring the grade line up to a point where all surface water will fall away from the house. Look out for the outside cellar steps and see that the coping of the area is in good condition and the steps themselves in sound repair. If this area is closed by wooden doors look to the hinges, as they are very apt to be rotted away.

In all masonry walls careful attention should be paid to such portions of the wall as lie behind the down spouts from the roof. If there has been any leakage here the mortar will have been forced out by the frost and will need careful repairs. That the down-spouts themselves should be repaired goes without saying. Examine carefully all copings wherever they occur, and see whether they are loose. If so, they should be reset in cement mortar.

THE OUTSIDE WOODWORK

The masonry walls having been inspected the outside woodwork should next receive close attention. The places where it is most liable to decay should be looked over, such as porch floors, hinges of outside blinds, and wooden cornices. Suspected places should be tapped with a knife handle or any hard substance. Soft decayed spots can thus be readily detected under whatever number of coats of bright paint. Look especially for rotting woodwork where such work abuts against masonry walls or in any other place where moisture is likely to lie. Test the porch floors by jumping on them to disclose weak or rotten floor joists. If the roof is of shingles examine it carefully about all chimneys, dormer windows, etc. as it is in such places that decay begins through imperfect flashings. Examine the outside shutters to see whether the woodwork about the hinges has rotted. Examine also the shutter fastenings embedded in the masonry walls to see whether they are loose. Wooden steps are very likely to prove unsound, especially the lower step. If the house is covered with shingles, or especially

if covered with siding, look carefully at the cornices, and around all window frames.

ABOUT PAINT

The condition of the outside painting will be evident from superficial examination except in the case of new houses. Here, more especially on the metal work, inferior paint is likely to have been used, which will peel off in a few months, leaving the metal bare. Genuine red lead is the only efficient priming coat for metal work of every description, but this, of course may be over-painted any color desired. Cheap paint on woodwork fades and washes off, owing to the widespread substitution of soap for genuine linseed oil in the cheaper brands of ready-mixed paint. There are so many tricks in the painter's trade that it is useless to attempt to safeguard the amateur by specifying this or that brand in preference to another. One good thing to remember about paint is that the lead is the protective element in it, and there is more white lead in light than in dark colors. There is only one way to secure good results, and that is by letting the painting contract to a painter in whom one has confidence.

OUTSIDE METAL WORK

All outside metal work should be carefully gone over, especially the flashings, valleys, and gutters of the roofs, and the rain water down spouts. As has already been suggested, leaking down spouts cause rapid deterioration in all walls whether of wood or masonry. See whether the spout fastenings are secure and especially that they are properly connected at their lower ends with the underground drain. Leaking connections here will dampen the cellar walls or may even flood the cellar floor.

If the house is built on made ground or on very soft permeable soils like sandy loam, especial care should be taken to see that no stream, however small, can trickle against the foundation walls. Serious results will follow owing to the washing out of a continually enlarging channel under the foundation walls. Reference has already been made to shingle roofs. If the roof is covered with slate or tiles see that none are missing. If the roof is of low pitch or flat, and covered with the cheaper grades of tin or patent roofing, look out for trouble. Make a careful inspection of attic ceilings — every square yard of them — and also of the attic walls near the ceiling.

In this way the extent and location of leaks in the roof can be most readily determined. The remedying of them is another matter. The only effective way to repair an inferior roof is to rip it off and replace it by a good one. On cheap roofs one repair leads to another and the final cost will pay for two good roofs.

Examine the glass in all the windows and see that it is not only sound, whole, and free from cracks, but that the putty has not fallen away on the outside. If it has, driving rains will find their way in about the outside edges of the glass and cause serious annoyance. Reputtying must be carefully done, with rather soft putty on old work.

GRADING

The invariable rule for grading is that it should be highest at the walls all about the house. Paved walks should receive attention. Cheap cement walks will soon fail partly from the use of inferior cement combined with an unduly large admixture of sand and broken stone, but more usually from imperfect foundations. Brick walks, though charming to the eye for color and texture, are, it must

be confessed, damp and slippery, and can be endured only when laid on a solid concrete foundation.

See that the grades are such that the walks are higher than the surrounding soil otherwise each will become the bed of a stream in rainy weather. Even city streets sometimes fail in this respect. Look to the character of the boundary walls and fences. See that they are in good repair throughout, that the gates do not sag through rotted woodwork about the hinges or incorrect construction of the gate, and that the posts of wooden fences at the ground level are sound.

THE INTERIOR

It is time to inspect the materials and workmanship of the interior of the house. Go at once to the cellar. Does it appear dry? Is it well lighted by windows? Has it a cement floor? Has it a plastered ceiling? How about the storage of fuel and getting it in from the outside conveniently. Can two kinds of coal be shot in without interference with each other, or extra labor? How about getting out ashes? Does the cellar smell musty? Are there any evidences of fungoid growths on the walls. Are the heating pipes or water

supply pipes boxed or wrapped for protection from the cold? If the house is heated by a furnace is this centrally located or, if not, is it nearer the northwest corner as it should be? Are the cellar stairs convenient as to location and especially are they well lighted? Is the heating apparatus, of whatever kind, in a pit that is sunk below the general level of the cellar floor? If so, water is likely to accumulate there in prolonged rainy weather. Is the furnace or other hot-air apparatus supplied with fresh air directly from outdoors by a special flue or air box, or must the household breathe warmed cellar air in winter? If you intend to burn pea coal in the heater see that the grate is of the proper pattern for such use. Most furnace grates are built to burn only the larger sizes of coal.

Is there any floor drain to carry off water that may find its way in from the outside or that may result from washing the floor with a hose or otherwise? If there be such a drain is it properly screened and trapped? How about the hose connections inside and out? Are they conveniently placed, especially on the outside where they will be used to wash the pavements and water the garden? Many houses have no such outside connections.

THE KITCHEN

Go up now to the kitchen and give it, with its adjuncts of store rooms and laundry, a thorough examination. Are the coal and gas ranges apparently in good order? Open the dust flue of the coal range and make some examination of the interior. Notice the condition of the fire bricks and the various dampers, the top of the range and the interior of the oven. Have all cracked covers and plates renewed. See whether the shaking apparatus for the grate is in good order and that all range tools are supplied. Will the range burn pea coal? Is the hot water boiler of good capacity and has it a mud cock and a safety-valve? Is the kitchen floor in good order and the hearth? How about the woodwork around the sink? Do the faucets leak? Is the waste pipe clear? Are the laundry tubs well lighted? Small kitchens and laundries are apt to be lighted by a central fixture — an ingenious arrangement for casting the cook's shadow over whatever she may be working at on the range, at the sink, the table against the wall, or when bending over the wash tubs.

Examine the doors of all closets and cupboards, and see that they open freely and shut

tight. Examine the locks and bolts of all outside doors and test the condition of outside door bells. If these will not ring it may be due to defective wiring, but it is more likely to be caused by run-down batteries, which may be easily and cheaply renewed. Is there a convenient place for the refrigerator, not exposed either to the heat of the kitchen or the outside summer sun? If it should have a waste pipe from the bottom be sure that this does not connect with the house soil pipe. It should run off to some independent point of escape where it will have no connection with the house plumbing, otherwise there is a very serious danger of contamination from the gases of decomposition in the sewer.

Make a similiar examination of the pantry. See that the sink is in good order, as to its supply and waste, that the woodwork about it is not decayed and that all the cupboard doors are well hung. See whether the back stairs are adequately lighted, whether they have any dangerous twist in them and that they have at least one door either at the top or the bottom. See that the swinging door from the pantry has a glass panel, that collisions, disastrous to china and glassware on incoming or outgoing trays, may be averted.

IMPORTANT INTERIOR DETAILS

The other rooms of the house so far as their arrangement is concerned will be discussed in another chapter. We may therefore proceed with an examination of walls, ceilings, and floors in general. On the first story look out for leaks in the ceiling, and if these are under the bathroom or under radiators have the cause of the leak investigated and proper repairs made. Notice the condition of the paper on the walls, also that of the paint or other finish of the woodwork, and examine the floors minutely with a view of having the flooring put in good order. Examine and test every window fastening. See whether the sashes will rise easily, are well balanced, and do not rattle in their run-way. Go up the front stairs rather heavily, springing on each step. See whether the staircase generally is securely fastened and braced. Notice whether the handrail is firm and the height of the rail around the opening of the upper floors sufficient to prevent accidents. Try every door in the house, opening, shutting, and locking it. See that there is an inside bolt to the bathroom door, but high up out of the reach of small children. Give the bathroom itself a

most careful examination and see that every fixture is in all of its parts in good working order and that each is separately trapped. All plumbing should be of the "exposed" type, that is to say it should not be cased in woodwork, but stand freely exposed on all sides. Is the second floor hall badly lighted, especially near the head of the front and back stairs. There is no excuse for this in wholly detached houses. In all cheaply built houses, and in some even of the more expensive kind, the attic rooms are apt to be unbearably hot in summer. This effect is usually due to improper construction of the roof. All rooms under a roof will be hot unless special precautions are taken. In the cheap house, thin boards and plastered ceilings enclose an air space. This becomes intensely heated in summer and radiates its heat to the rooms below. All air spaces in the roof should be carefully avoided as far as it is possible to do so, and the roof boards should never be less than an inch and a half thick, and a layer of non-conductive material between the boards and the outside roof should be regarded as essential. The more usual and meager construction above referred to also results in making attic rooms cold in winter, although

such rooms, under normal conditions are most easily heated especially where a hot air furnace is used. Air leakage around dormer windows in cold windy weather is a very general fault, and the same remark applies to all bay windows especially if constructed of wood. Such leakage is the result of carelessness in construction and is not inherent in either type of window. It is due to improper connection between the dormer window or the bay window and the main body of the house.

Inside blinds are very apt to be out of repair and should be given careful examination as to their hinges, fastenings, and rolling slats.

WOOD, BRICK, STONE, OR CEMENT?

On the general question of the relative value of the three types of houses — wood, brick, or stone — general conclusions must suffice. Wooden houses if well built are of course not only the cheapest to construct but are dry at all times; warm in winter; though not always as cool as might be desired in summer. This latter defect, however, is readily overcome by heavier sheathing boards and stout sheathing paper on the outside under the shingles or clap boards. That variety of wooden house

known as " half-timbered " is of so expensive a character when properly built as to preclude it from consideration here. If cheaply constructed it is one of the most difficult to keep in repair. Brick houses are apt to be damp unless protected by some waterproof solution, applied on the outside as before suggested. If fully exposed to the sun's rays in summer and not having an air space in the outside walls they are apt to become unduly heated. Thin brick walls also chill readily in winter. An old-fashioned stone house is not only cool in summer but is apt to be too cool, the temperature inside the house forming, in too many cases, too sharp a contrast with that outdoors to be wholesome. Such houses, moreover, are apt to be damp, because the walls will not only absorb moisture during rain storms but their great thickness will prevent this moisture from drying out. The next rain storm will add to or renew it, and so the walls have a tendency to be kept continually damp. The effects of this, however, may be obviated if the wall is built hollow, or has an inside brick lining separated from the outside wall by three or four inches of air space. This is a common form of construction in England, and may be found in many old houses in this

country, though it must perhaps be said that the majority of American stone houses are not so built.

As concrete houses are receiving increased attention a word of caution regarding them is necessary. Concrete, unless specially prepared (which is not usually the case) for the outside walls of houses, is not waterproof, but on the contrary will absorb a good deal of moisture and for this reason it is absolutely necessary that a house with concrete walls should be built with air spaces between the outer and the inner side of all outside walls. A word of warning should be also uttered regarding the wholly unfounded statements which are being put forth by some manufacturers of Portland cement as to the relative cost of such houses. They cannot be built for anything approximating the cost of a wooden house if the construction is done with due regard to the health of those who will live in the house after it is finished. Concrete in proper hands and used with an adequate knowledge of its limitations and possibilities is one of the most valuable building materials for domestic work, so far as relates to floors, interior partitions, and the foundation work of staircases. It is superior in its sound-proof

and fireproof qualities to any other material, and if I were building a house to-day for my own use I should regard all such conditions adequately met if the outside walls were of brick and all interior floors, partitions, and the roof were constructed of reinforced concrete. But this is not an economical method of construction, except as regards its durability over a long period of years and its fireproof qualities under all conditions.

This question of fireproof houses is one which is of the greatest importance, but it does not properly fall within the scope of this book, on account of the expense of securing such conditions, but it is alluded to for the purpose of showing the advantages to be obtained by the use of reinforced concrete on the interior of the house, as above suggested, when the outside walls are of brick or stone. Any fire, which might originate anywhere in such a house could be regarded with relative equanimity, as it would be the easiest of tasks to confine it to the apartment in which it might start by the simple expedient of closing the doors, if the first efforts to extinguish it with ordinary hand appliances should fail. This of course presupposes the use of fireproof metal doors, which are now easily obtainable

in forms perfectly suited for domestic use. A fire confined to one room would soon burn itself out and the resulting structural damage (aside from that to draperies, carpets, etc.) could be repaired at a very moderate expense.

Wood under usual conditions is the cheapest building material. The exact ratio between wood and masonry it is impossible to state, owing to varying conditions. Usually brick work is cheaper than stone work in varying proportions, due to like differences in condition. Stone work under usual conditions is more expensive, although of course with stone to be had almost at one's door and of a kind cheaply gotten out, in a country where there are no brick clays, it would undoubtedly be the cheaper material. A peculiar condition of affairs exists in Philadelphia at the present writing with regard to the relative cost of brick work and stone masonry. There are, in and about that city, numerous brick clay beds and many brick yards producing all grades of commercial brick. In spite of this fact, however, it is actually cheaper to-day in some parts of the city (notably in Germantown) to build a house of the beautiful local stone for which Philadelphia is so justly noted. This has been tested by recent contract for a

dwelling house costing about six thousand dollars, in which the mason's bid was four-hundred dollars less for stonework than for brickwork for the outside walls.

FIREPLACES

If there are open fireplaces in the house their probable defect will be poor draft. This may be detected by a darkening about the upper edge of the opening where smoke has puffed out into the room.

Remedying smoky fireplaces is a matter about which no general rule can be given. Sometimes it is sufficient to heighten the chimney either by building it up or placing a metal cowl on top. Sometimes a chimney smokes only in certain stages of the wind in which case a metal hood properly adjusted will suffice. In other cases the fault may be due to a radical defect in the form or construction of the fireplace itself, in which case nothing short of tearing out and rebuilding will suffice. This, however, is not so formidable an operation as might be supposed.

A fault seldom suspected and not generally understood is a deficient air supply for the fireplace. This is likely to occur if the fire-

place is unusually large or the room in which it is placed be so tightly closed as to make it impossible for the strong updraught in the flue to find the inflow of fresh air necessary to maintain it. Usually the best cure is to make an air supply flue for the fireplace from one of the lower floors, preferably the basement. This flue, of course, must be safeguarded from the fall of ashes or hot coals, but the means of doing this will present no difficulties to the practical constructor, who will devise special means to fit the peculiarities of individual cases. The application of this remedy will, in some measure, diminish the efficiency of the fireplace as an extractor of used air from the room itself, but that hit-or-miss system of ventilation has been generally outgrown.

CONCRETE CLAIMS

A word or two more may be said about concrete houses. Mr. Edison has been widely credited with a statement that he has perfected an entirely new method of handling this building material, by means of which it will be possible to "pour" houses with unexampled rapidity and cheapness. The claims made for this new process may be best explained by the

following extract from an alleged interview in *"Common Sense."*

> "I'll dig the cellar of this house with a steam shovel," he said, "and cast it in six hours. Two locomotive cranes will lift the two hundred and thirty-two cubic yards of cement that the house will contain and pour it into the openings at the top. The cement will pass through twelve sluice-boxes, and as it is being poured, a number of men will churn it with iron bars, at the end of each of which will be a large ball. The churning will be for the purpose of sending waves through the cement, so that it shall fill every particle of the molds."

. . . . . .

Wet cement freezes in winter. Recollection of this fact brought the thought that houses could not be poured from fall until spring. Edison, also, had thought of that. Furthermore, he had found a way to surmount the obstacle created by low temperature.

> "Before a gallon of cement is poured," said he, "the furnace, radiators, and pipes will all be in place. When I set up my building molds, I shall simply place the heating-plant as if it were intended to remain in the iron house formed by the

molds. Then, if it be winter, I shall start a fire in the furnace. That will make the cement, after it is poured, dry even better than it would in summer; so cold weather will not interfere with the new method of construction.

It must be noted, however, that experienced architects, engineers and builders, whose extensive acquaintance with the capabilities of cement and concrete has been acquired through years of practical operations, have not received these claims with enthusiasm. In spite of the inventor's statement that he has discovered a new ingredient whose use in the plastic mixture makes it flow with the highest degree of fluidity, it will require many demonstrations on a large commercial scale to overcome this skepticism. If it were possible, it would certainly remedy many difficulties in the way of housing the poor in a sanitary and economical fashion, but at this stage of development, the invention is not one that can be recommended as likely to afford a speedy relief for the difficulties dealt with in this book.

CHAPTER VI

WHAT IS THE PLAN OF THE HOUSE?

PRIMITIVE man, whose chief concern was with the elemental means of existence — that is to say, with food and shelter — doubtless often found in caves a welcome refuge from stress of weather; from heat, cold, storm and sunshine. Here he housed his family and followers and the routine of their life was simple in the extreme.

By day and night all the members of the household gathered about the family hearth, working at their indoor labors, and sleeping within the four boundaries of this simple home. In all ages of the world wherever we find man in an elemental stage of civilization he is always satisfied with some such unsophisticated type of abode, even when he has to build it himself.

In England as late as the tenth and eleventh centuries the house of the Saxon thegn consisted of a single room, the Hall. But as time goes on and life becomes more

complex, man slowly awakens to a consciousness of the value of privacy which develops more or less in detail, and in northern England rooms of specialized use came, in the course of time, to be added to the Hall. Thus we have the "Chamber" or private sleeping room of the master and his immediate family and the "Solar" or drawing room, which is the day room for the family.

In later times other rooms are added, and very gradually the "buttery," the kitchen, etc., make their appearance, as it is felt proper to specialize and keep separated the several tasks and details of the daily family routine.

But all this time the relatively modern idea of "thoroughfare" or passageway does not appear; and even so late as the reign of Elizabeth we sometimes find long suites of rooms without any common corridor, making it necessary to pass through all the intervening rooms to reach the furthest in the suite. It is only in recent times (practically since the eighteenth century) that the thoroughfare has become fully developed in houses of discriminating people. Attention is called to this historical phase because there has recently appeared a tendency to revert to the more primitive plan in houses of the so called

"Dutch Hall" or "Reception Hall" type which are being built for speculative purposes.

The characteristic of such houses is that as soon as the front door is passed the whole interior of the house on the lower floor, with the possible exception of the kitchen, stands fully revealed to the most critical inspection. There is often it is true some pretense of distinguishing the parlor from the hall and the hall from the dining room but as these all open into each other by wide and doorless openings the separation is merely sentimental and not in the least effective. Inquiry as to the cause of this strange reversion to type in the "operation" house leads to the explanation that such houses are being taken up by people who have been crowded out of the older wards of the city by throngs of immigrants of every nationality who make extremely undesirable neighbors until they have been trained by example and experience in American ways of living. In these older wards land is valuable and rentals high, and houses originally ample for one family very inadequately serve the needs of two or three. These, fleeing before the new barbarian invasion, find small houses in the suburban districts at reasonable rentals or even purchasable

on easy terms. Since the quarters they have just left were cramped and condensed to the utmost limit of endurance, the one idea of these immigrants is that the new house shall express the paramount idea of spaciousness however small its real dimensions. Hence this reversion in principle to the more primitive type.

People who have made further progress along those paths which lead to the refinements and amenities of social life require that the more intimate family life shall be safeguarded against intrusion by the casual visitor or stranger. Hence, however spacious or numerous the family apartments may be it is highly desirable that one room be set apart from these where all casual visitors may in the first instance be received. Even in small houses loss of spaciousness will be little regarded by those in whom a higher refinement has been developed. Figures 8 and 13 indicate the type of house above referred to, the former as usually built, the latter, the house with the modifications suggested. In the first example it may be seen that whoever enters the reception room commands a view of the entire lower floor, whereas in the second case this room is isolated and family life in the hall and

dining room suffers no unexpected interruption.

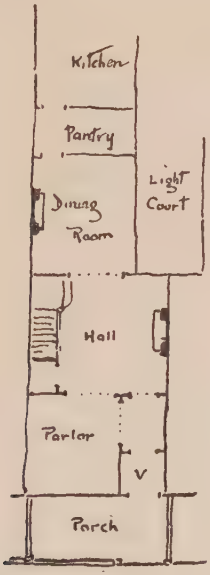

Fig. 9. First Floor Plan.

Such houses in Philadelphia are usually built on lots sixteen feet wide, though often no wider than fourteen.

As this book is chiefly addressed to those who will rent or possibly buy a ready made house rather than build one to suit their own inclinations, it will not discuss very fully the

principles of house planning, but will indicate here and there where to modify plans not wholly suited to individual cases.

OWNERSHIP, SITE, COST

Individual predilection must of course be given full sway, for a man is entitled to live as he likes so far as his liking is decent and orderly and not otherwise to the detriment of his neighbors. From this point of view it may be noted that the three controlling factors of house planning are, in the order of their importance, ownership, site, cost. From our present point of view, cost might be regarded as the prime consideration, but it does not really and fundamentally affect the plan so much as do the views of the owner and his habits of life and the place where the house is to be built. Some men, even though compelled to live in small houses, like to entertain a good deal. Others live quietly, seeing only a few intimate friends. Some are of studious habits, others look away from home for their amusements and recreations. Then again, there is the question of the size of the family to be taken into consideration. These

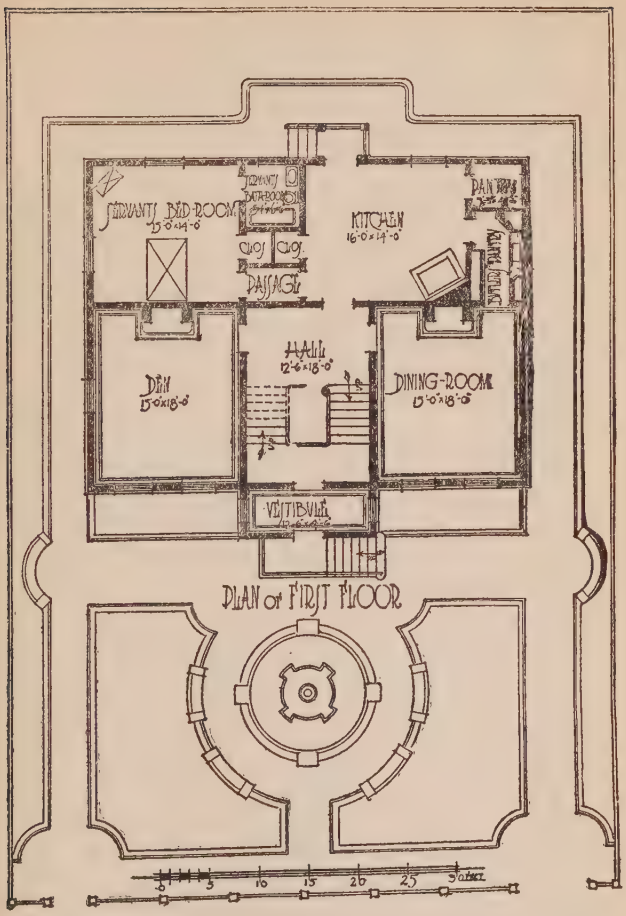

Fig. 9. First Floor Plan of an Austrian house. Drawn by W. N. Smith, Architect.

are the considerations which the effect of ownership introduced into the problem. Site we have already considered and the limitations of cost are inexorable. On this latter point, however, this much may be said: better good

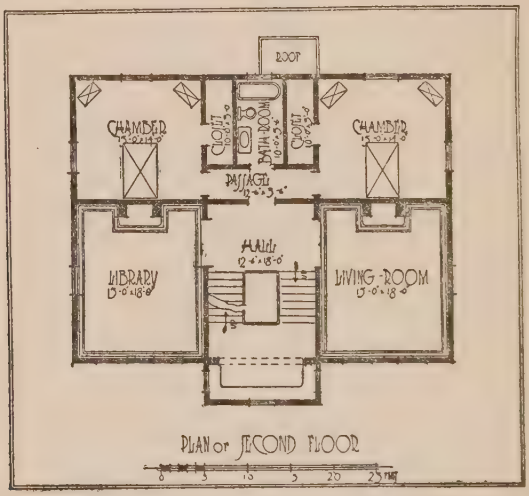

Fig. 10. Second Floor Plan of an Austrian house.

materials and construction and a small house than a pretentious plan and a flimsy house.

The question of the amelioration of the plan of ready made houses assumes such protean shapes that it is not practical to give any very

general rules for dealing with it. Each case must be examined, diagnosed, and remedied by itself. Let the intending renter or purchaser after assuring himself of the desirability of the house from a sanitary point of view picture to himself his family living in the house. How will they dispose of themselves by day or by night? How will the various home activities and interests of each member be met by the new house in the order of their importance. What alterations would make the new house meet these in a more desirable way? Are such alterations economically possible? When these questions are determined for the particular occupant and the particular house some effort should be made to induce the landlord to meet them either by an offer to slightly increase the rent or by an offer to lease for a term of years if one's business interests will make that practical or advisable. He may thus be willing to cut a door here, to close another there, to enlarge an existing bathroom, or install a second one either on the third floor or in connection with the principal family bedroom suite; to add a small laundry and ironing room or a cold storage compartment in the kitchen, which can

often be obtained at small expense by the simple expedient of enclosing a portion of the kitchen porch. In other matters and at a relatively small expense one may do much to change an unsympathetic plan into one more in harmony with one's habits of life. New papering, paint, and all ordinary repairs, even to the cementing of the cellar floor, or plastering of the cellar ceiling, can usually be accomplished without any additional cost by a good tenant, even if only on yearly lease.

CLOSET SPACE

Most small houses built for rental are very defective in the provision for closets and storage spaces. This is certain to be the case in all small houses with flat roofs. Careful attention should be given to this point when examining any new houses and provision for additional closet room insisted on, if the "condition of the market" makes the landlord anxious to secure a good tenant.

The best place for bedroom closets from every point of view is along the wall next an adjoining bedroom. These closets act as soundproof devices which greatly enhance the

comfort of the occupants of each room. It is very desirable that a linen closet have a window in it if this be at all possible.

All closets have their usefulness greatly increased when the house is electrically lighted if there be in each closet a ceiling light which is automatically switched on when the door to the closet is opened and switched off when it is closed. The switches to hall and bedroom lights should be placed in the most handy position, that is, where one enters or approaches the hall or bedroom.

LIGHTING DEVICES

Electric lighting devices for gas fixtures are a convenient auxiliary if properly installed with good materials, but in many renting houses of the less expensive class the installation is poor, and something is continually going wrong with them. Weak batteries are easily remedied, but the system breaks down more often from defective workmanship and material.

Some danger, too, is present from the possibility that the auxiliary cock required to operate them may leak, and this is too often

depended on to shut off the flow of gas from the supply pipe to the burner, to the exclusion of the regular stop cock on the bracket.

KITCHEN CONVENIENCES

It is time to turn our attention to individual rooms. Let us consider the kitchen and its equipment and appurtenances. If the kitchen is to be used for cooking alone, in families where only one servant is kept or where some member of the family will do the cooking, a small kitchen is very much to be preferred to a larger one. A room 9′x11′ or 10′x12′ is abundantly large if it can be properly arranged.

If stationary washtubs have to be included in this room, however, the above dimensions will be too small, but it is most desirable that the laundry work should be done in a separate apartment, no matter how restricted in size. Two tubs will suffice if there be not room for three. If they must be placed in the kitchen see that they stand somewhat apart from the kitchen equipment proper so that the two operations will not interfere with each other.

The absolutely essential equipment of a kitchen will consist of a coal range supplemented if possible by a gas range for occa-

sional and summer use. A kitchen sink of cast iron with hot and cold water and some form of water heater, whether this be a water back in the coal range or some other device for giving a reasonably continuous supply. A hot water storage reservoir (or boiler as it is more commonly called) should be placed immediately over the kitchen range above the hot shelf or suspended from the ceiling. This saves valuable floor space which can be occupied to better advantage by the small gas range.

Next, the kitchen dresser and a small closet, the latter serving a double purpose, being arranged in its lower part for the heavy pots and pans and above for the storage of the bulkier articles of food.

In these days of the nearby grocer and butcher, with the telephone handy, large kitchen store rooms are not needed unless one desires to place the refrigerator there. In this case the store room should have an opening on the back porch, if it can possibly be so arranged, for icing the refrigerator from the outside. Built-in refrigerators are of course far the best but their expense precludes them from consideration here. The refrigerator must of course be protected from the sun.

THE RANGE

So far as cooking is concerned, no more wasteful contrivance has ever been devised than the coal range. Having this point in mind someone has defined cooking as a by-product of waste heat, which in a large measure is true. Cooking on a gas range is well enough if the price of gas is not over a dollar a thousand and due vigilance is observed in its economical use. Where the gas range fails is in its inability to supply hot water for the family use. There are, it is true, gas water heaters, but they are extremely uneconomical in spite of all advertising statements to the contrary.

Probably the ideal arrangement from an economical point of view would be a gas range, a fireless cooker, and a hot water heater using coal for fuel. The consumption of coal in the water heater would be a comparatively small expense. The gas range could be used for the starting of all boiling, roasting and stewing operations which could be completed in the fireless cooker while bread, steaks, etc., could be cooked in the usual way on the gas range. Electric cooking, while more convenient than any other form, is prohibitive as to its cost in

all cases where economy in the kitchen must be given any consideration at all.

POSITION OF THE KITCHEN

The position of the kitchen in the plan should be on the north side of the house, preferably near the northeast of the house, for the reason that prevailing winds in summer are always southerly and at a time when the house is most open a kitchen on the south side will have its odors blown all through the house. A kitchen should be lighted by two windows if possible each window in a different wall so as to insure some sort of a cross draft. Have one of these windows if possible over or near the kitchen sink.

Care must be taken to see that the back stairs do not serve as a funnel for conducting the kitchen odors to the upper part of the house. This can be prevented to some extent by a swinging door on the house side of the kitchen and a second swung door either at the top or bottom of the stairs, preferably the latter. Back stairs should be lighted by a window in the outside wall, and winders avoided if it is possible to get up without them, as they are dangerous.

THE PANTRY

The dining room pantry, commonly misnamed the butler's pantry, should be made as large as possible — much larger than the space usually assigned to it in the ordinary house. If one had but eighteen feet to divide between the width of the pantry and the length of the dining room it would be very much better to make the pantry six feet wide rather than five and diminish the length of the dining room by that foot. There is no room in the house where generous space gives better returns in comfort and convenience.

It is well worth while to supplement a kitchen sink by a second sink in the pantry. This should be oval in plan, but with a flat bottom, and made of tinned copper, so that thin glassware and porcelain may not be easily broken in it. See that there is plenty of elbow space about the sink and that it is very well lighted.

At least one side of the pantry should be occupied by the china and glass cupboards and a portion of the other by a wide shelf or table for the preliminary arranging of the table service and the reception of used dishes and plates. This will save many steps to and fro.

Dining room in the house of the Chaplain
to the Grand Duke of Hesse

THE DINING ROOM

The size and shape of the dining room should, if possible, be such that when all the furniture is in place (that is to say the sideboard, chairs, etc.) there will be at least 28″ clear around the edge of a four foot circular table. This is the minimum space for service behind chairs of persons seated at the table. Such a table will seat comfortably six people, more comfortably four, and (with one leaf in) eight can be easily accommodated.

If the dining room is to be arranged for more than six people at the table it should be longer in one direction than in another, that is to say along the axis of the table when extended. In some cases it is good economy to take a foot off a portion of the width of the pantry and throw it into a recess long enough to include a sideboard which will then be at least partially withdrawn from the actual floor space of the dining room.

A bay-window on one side of the dining room is a great help in adding to the working area of the room, since the dining room table can be set a little to one side of the center, the bay-window serving as a passage way around one end of it. Such a window adds

materially to the appearance of the room, especially if it be large enough to receive a shelf for flowers. A fireplace in a small dining room is not to be recommended, as it will be too close to the dining room table to be comfortable. In larger rooms this is a very agreeable adjunct, especially on cold winter mornings.

THE LIBRARY

If there be a room set apart especially for the books — though this is not likely to be the case in small houses unless the owner be a professional litterateur — it is important that it should have abundant window light from one side of the room at least, and it may well include a fireplace, however small the room may be, with the book shelves arranged about four or five feet high and occupying all of the available wall space.

THE LIVING ROOM

The fault of most small house plans is that they attempt to imitate the plan of a larger house. This pretentiousness results in many discomforts. The plan, in the first place, will be divided into a number of small rooms of

equal size which renders the interior effect very unattractive. Moreover there is no one room where the family can gather without feeling cramped and shut in. It is therefore always better to have one large family living room on the ground floor, eliminating the library (or even, if necessary, the dining room) as a separate apartment.

If there be a reception room cut off from the rest of the house in the way already indicated, all that is really essential in a very small house will be one large apartment to be used as a day living room for the family and a small but well lighted stair hall, not however used in any sense as a living room. At the end of the living room, next the pantry, a dining table can be set out which at meal time can be screened from the rest of the room if desired by a curtain or a folding screen. The old fashioned type of dining table known as the Pembroke, which when not needed between meal times folds up into a small place against the wall, is admirably adapted for such a use. In somewhat larger houses, space may be well spared for a separate dining room, though this may, even here, take the form of an alcove opening off the large living room.

It is only in remote parts of the country that

the idea of the best parlor survives. This was a room, usually quite as large or even larger than any of the family living rooms, but shut up most of the time, and chiefly used for weddings and funerals.

THE STAIRCASE

It is worth while in planning to give ample space to the principal staircase in order that the steps may be easy. It should be so planned if possible that there are no winding steps at the turns. It is also quite important that it should be well lighted by an outside window, at the head of the stairs preferably, and that it should be shut off from the rest of the house either at the top or the bottom by a swinging door. Nothing adds more to the discomfort of a house in cold weather than the ordinary staircase, which serves to create a strong draft from below upwards, sucking up all the heat from the lower rooms and making the upper floor of the house unnecessarily warm. Under certain circumstances this latter condition may be reversed, and a down draft created, especially if the windows on the second floor are opened in cold weather. In one case

which has been observed kitchen odors have been carried to the second floor by the rear stairs and to the front part of the house on the lower floor by the front stairs, the intervening dining room itself being entirely free from such odors.

With regard to the reception room, to which attention has already been called, the only requirement that need be observed is that it be immediately accessible from the entrance and does not open into any other room of the house. If one could be sure that a second door, opening into the staircase hall or the living room, can be always closed when necessary, there would be no objection to such a door, but if it is to be found open at the wrong time the whole object of the reception room will be defeated. It is therefore wiser not to provide such a door.

With regard to outside porches they may occupy almost any position except toward the West, and even this is desirable if there be more than one outside porch, in order that the views of the evening sky in summer may be had — although in the afternoon for two or three hours before sunset such a porch is practically unusable during hot weather.

BEDROOMS

Passing to the second floor of the house it may be said with regard to bedrooms in general that their doors and windows (and fireplaces if they have any) should be arranged with some reference to the question of where the bed may be conveniently placed. This detail seems to be quite overlooked in most cases, for some unexplicable reason. Doors should not be placed in the middle of walls except where it is desired that adjoining rooms should open into each other with the best effect possible. In all other cases available wall space is disturbed and too broken up often into small and practically useless spaces.

Reference has already been made to the importance of securing ample closet space and the best position for such adjuncts. A square form is not the best for bedrooms, unless the adoption of any other shape will result in a room less than ten feet wide. Oblong rooms of reasonable width are much more desirable and every attempt should be made to get away from the square box-like appearance which bedrooms generally assume in the hands of operative builders. Although one cannot always approve the details of Baillie Scott's in-

terior arrangements, he understands the art of avoiding the conventional rather better than most architects.[1]

One's plan may assume so many different shapes that it is quite impossible to generalize very much about bedroom arrangements and the relations of the several rooms of the bedroom floor to each other. In the examples given in this chapter, good arrangements for the particular cases illustrated may be studied. If there be only one bathroom on the principal bedroom floor, it is very desirable that it should not be placed in the center of the plan, and especially not near the head of the principal staircase nor over the dining room.

The modern American ideal, which is attained in all houses where cost is not too closely considered, is to have an individual bathroom for every bedroom; but for houses of even moderate cost this is of course out of the question. It ought to be regarded however as almost if not quite essential to reasonable living that the principal bedroom or suite of family bedrooms should have a bathroom for its exclusive use and one other bathroom for the other family bedrooms. In

[1] See "Houses and Gardens," by M. H. Baillie Scott. London. Newnes, 1909.

houses of larger size, where a bedroom can be reserved for the exclusive use of guests, this also should have its own private bathroom. Three family bathrooms then may be regarded as not unduly extravagant, taking into consideration our habits of life.

Nothing surprises the American traveling abroad for the first time quite so much as the intolerably limited accommodations of this sort which even houses of the best class in England afford. On the Continent of course, owing to racial differences, conditions are still worse, though Germany perhaps is the worst offender in this particular. The growing German liking for the English house plan is effecting a material improvement in the newer houses.

POSITION OF ROOMS

While one is often obliged to "take what is left," when renting, the following considerations will make clear to the house seeker why one side of a street, or one corner, is better than another. How seldom is there any indication in advertisements of new houses as to which side of the street they are to be found on, yet the difference is one of the greatest im-

portance, and will often, if considered, make the choice between two houses an easy one.

We have already spoken of the position of the kitchen when dealing with the question of aspect. Continuing this phase of the subject, we may consider the relation of the other rooms to outside influence. The best position for the dining room is toward the southeast, since here we get the early morning sun in winter, and the winter sun well past the midday meal if there be a southern window, while at the same time this position protects the dining room from the rays of the late afternoon sun in summer. If the kitchen be in the northeast corner of the house, as already recommended, this will bring the dining room into proper relation with it.

The plans in Figures 11 and 12 show a house of moderate cost which in the arrangement of its rooms illustrates the principles above.

For the general day living room of the family a southerly exposure is the only one that ought ever to be considered. The aspect of the reception room is a matter of no importance, its relation to the front door fixing its position on the plan.

For the library a northerly exposure gives excellent light for serious work, though such

an aspect, of course, is rather cold and cheerless in winter. A western exposure is the

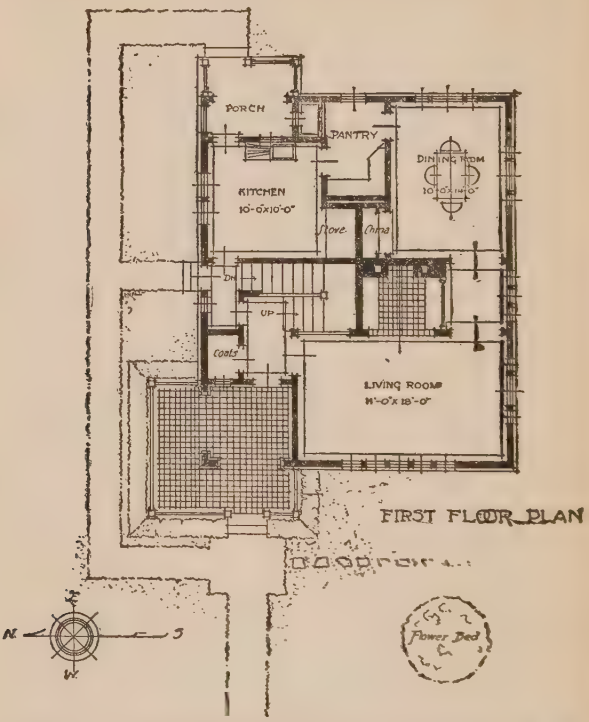

Fig. 11. First Floor Plan of a $5,000 house, by C. M. Craig, Architect.

least desirable of any, owing to the cold westerly winds of winter, and the long hot summer afternoons when the sun in the latter part of

the day is approaching the horizon. Under such conditions a library is almost unusable, because it is not possible to admit any adequate amount of light without admitting the direct rays of the sun also.

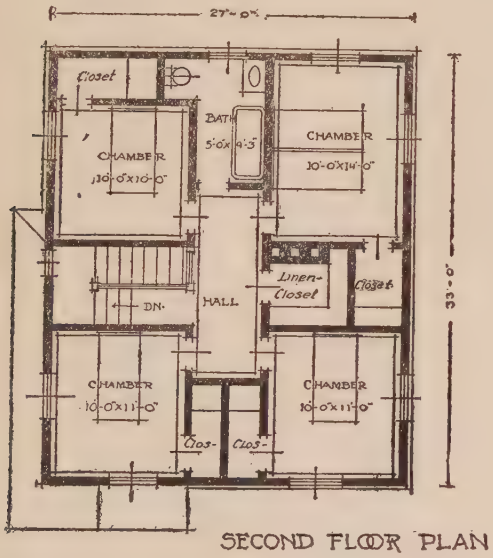

Fig. 12. Second Floor Plan of the Craig house.

For all bedrooms a southerly aspect is most desirable, that is to say, either south, southeast or southwest. For reasons already suggested west and northwest are particularly disagree-

able, and this aspect should be reserved for the less important rooms in the house.

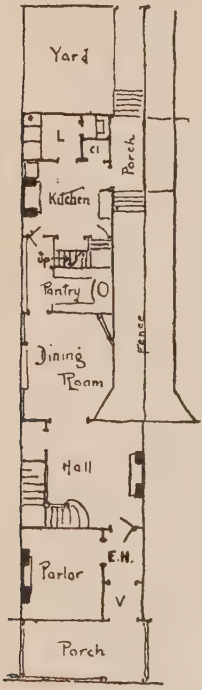

Fig. 13. First Floor Plan.

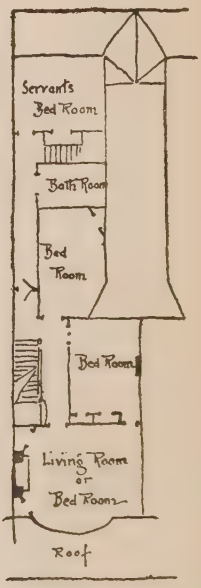

Fig. 14. Second Floor Plan.

BEST PLAN FOR A SMALL CITY LOT

Figures 13 and 14 show the first and second floor plans for about the smallest practicable

house, of the type now under consideration, which it is possible to build on a city lot. The lot is supposed to be sixteen feet wide and eighty feet long. On the ground floor we find the porch. This is usually regarded as an important adjunct in the outlying residential districts. V is the vestibule and E H the entrance hall. From this opens a small room 10x12, named on this plan the parlor. This term parlor is used throughout this book in lieu of the more familiar name reception room. It opens directly off the entrance hall and has no other door of communication with the house. Its purpose has already been explained.

The hall, which is often called the reception hall, combines here the function of a general sitting room and a staircase hall. It opens by a wide doorway into the dining room and is lighted by a window four feet wide from the narrow light well between the two houses. Increased space for this window is made by forming the shape of one side of the dining room in the form of a bay as indicated, the other oblique side of the bay being taken up by the dining room china closet. On the opposite wall a space is arranged for a shallow sideboard with plate shelves on either side. This

room is 10x12, the smallest possible dimensions for such a room. Adjoining it is a pantry of generous width, next to which is the foot of the back stairs to the second floor.

The kitchen is 9x11 and has two roomy closets one of which, if desired, may be used for the refrigerator. The kitchen porch is little more than an open air passageway under a roof with steps to the side and rear yards. L is the laundry, with the servants' closet opening off.

It may be noted in regard to the light well that its value would be greatly enhanced in all cases if its walls were painted white, and it may be noted further that a window at the end of such a light well, however narrow this well may be, is many times more valuable than one which faces the well at right angles. Two fireplaces are shown; one in the parlor and one in the hall.

It will be noticed that between the entrance hall and the hall proper a double-swing door is shown. As a rule such doors have not been developed to their proper capacity, having been relegated to the minor purpose of automatically closing the thoroughfare between the dining room, pantry, and kitchen; but they may be made ornamental by means of

leaded glass panels and should be used without hesitation wherever (as in the case of the hall in this house) it is desirable that any opening which might cause drafts be kept automatically closed. The opening from the dining room to the hall may be closed either by a heavy curtain or still better by a large sliding door. In this way, taken in connection with the double swing door at the head of the main stairs, the lower hall can be kept as free from drafts as any other room.

A large closet opening off the hall may be used partly for hats and coats and partly for general storage purposes, all spaces of the latter kind being specially valuable in a house of this kind.

THE UPPER FLOORS

On the second floor the living room occupies the entire width of the house, with a fireplace having closets on either side. If a large family has to be accommodated this may be used as a bedroom. Two family bedrooms and a family bathroom are shown on this floor, the servants' bedroom being shown in the rear over the kitchen and at the head of the back stairs, its proper place under every

consideration. The bathroom is in a retired place and being directly over the pantry below concentrates the plumbing and so lessens the cost.

The plan of the third floor would depend upon the amount that can be expended upon the house. It might contain only two bedrooms over the front portion of the house, the rear extension being roofed over at the second story, or still better three bedrooms and an additional bathroom might be added; and it would make a very small further addition to the cost if the servants' bedroom were carried up at least a half story higher than the second floor and roofed over by a steeply pitched roof, giving an ample storeroom, the general utility of which would fully warrant the slight additional expense.

This plan as shown and described represents what should be regarded as the minimum accommodation of such a house considered as a commercial investment. It does not represent the full possibility of such a house built upon such a lot, should one prefer a smaller but more conveniently arranged house to a larger house but one with relatively meager accommodations, since the arrangement shown represents merely the utmost that can be gotten

out of a plan on so narrow a lot to meet the average commercial requirements usually demanded. To improve this plan to its utmost capacity the servants' bedroom should be enlarged to include the whole area over the laundry (thus affording room for two servants,) and the bathroom next the rear stairs made the servants' bathroom.

Bedroom number two should then be divided into two parts, one of which would be a bathroom opening off the bedroom number one, which would be used as a guest's room, and the other part fitted up as a capacious linen closet and clothes storage closet.

On the third floor the space over the servants' bedroom should be carried up to form a storeroom as previously described, and three bedrooms and an additional bathroom provided on that floor. The front room is the living room. The bedroom opening off the staircase hall might, as an alternative scheme, be reserved as a guest's bedroom, and of the two bathrooms on this floor the rear one is for the servants and the intermediate one exclusively for the use of the guest's bedroom. The servants' bedroom has been enlarged to afford ample space for two beds. On the third floor there are four family bedrooms and a bath-

room but this arrangement might be still further improved by dividing the second bedroom from the front into two parts, the rear of which (with its window opening into the court) should be a bathroom for the use of the principal family bedroom in front, and the other part made into a large linen closet or storeroom. The two rear bedrooms would then use the rear bathroom, as shown in the former plan.

While this would undoubtedly be regarded as an extravagant outlay for plumbing, it undeniably combines in a small house all those conveniences which only a much larger house is usually supposed to give.

In both of these houses the heating apparatus would be placed under the staircase hall the room under the parlor being reserved for fuel.

While the above suggestions savor, confessedly, somewhat of extravagance, they have purposely not been confined within the limits of the strictest economy, judged by current house-operation builders' standards. They are presented in this book for the purpose of stimulating the reader to demand from his operative landlord something better in the way

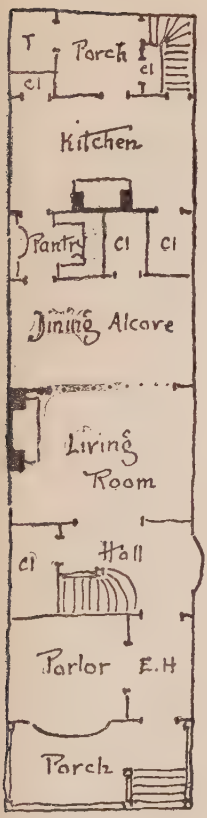

Fig. 15. Suburban House on a twenty-five-foot lot, ground floor plan.

Fig. 16. Second Floor Plan.

of house accommodation than the genus is usually moved to offer.

Improvements in real estate do not, in the class of houses which form the topic of discussion in these pages, come from landlords' philanthropy, but from demands on the part of tenants. And these demands will be made the sooner, and the more insistently, the more renters are stimulated to think for themselves, to know what they want and why.

A NARROW SUBURBAN HOUSE

Figures 15 and 16 show the first and second floor plans of a small house adapted to a narrow suburban lot twenty-five feet wide.

The house itself is sixteen feet wide, but of course has the advantage over the city house of the same width in that it has light and air on all four sides, whereby the plan is made much simpler in arrangement. In this plan the arrangement for the living rooms suggested on page 99 has been utilized, and instead of a separate dining room an alcove, in which the dining table may be placed, is shown opening off the living room. A curtain drawn across will conceal the table from view when desired.

Although only one bathroom has been shown in this house, the same modifications may be made here as were suggested for the narrow city house shown in figures 13 and 14.

The third floor plan of this suburban house would depend upon the accommodation required. The staircase hall and the front bedroom could be carried up to the full height, the rest remaining as a half story under the roof, for storage purposes. Or an additional amount of the rear portion could be carried up the full height as desired and another bathroom added if the expense would not be regarded as prohibitive. About two hundred and fifty dollars should be reckoned on as the total additional expense of providing the additional bathroom. Considerable economy could be effected in building such suburban houses if the owners of adjoining lots would combine their interests, placing the houses together, with a party wall in common, and readjusting the plan to suit. This would not require any radical change in the plan and the two houses need not have identical plans. The gain here lies in the substitution of one interior wall for two exterior walls, the simplification of the roof problem, and especially the gain in the width of the lot left between ad-

joining houses. In the plan as drawn, only four feet is available on either side of the house for a passageway. Under the party wall scheme this would be increased to eight feet for each house, while if adjoining lot owners would pursue a similar arrangement the houses would be sixteen feet apart, instead of eight feet as in figures 15 and 16, or twelve feet if only the two owners combined.

The house shown in the foregoing figures is the only type possible for a lot twenty-five feet wide if a free passageway is to be maintained on both sides of the house, and suggests the absurdity of buying country property by the acre and dividing it into suburban lots only twenty-five feet wide.

As suggested above, a double house on a fifty foot lot should be regarded as the lowest amount of space to be accepted, and this should only be tolerated where the lot lies close to the thickly settled portion of the city and prices are correspondingly high. Even under the best conditions (as has already been shown) only sixteen feet of open space can be maintained between the houses, and this is too little for real comfort and privacy. A lot fifty feet in width for a single house should

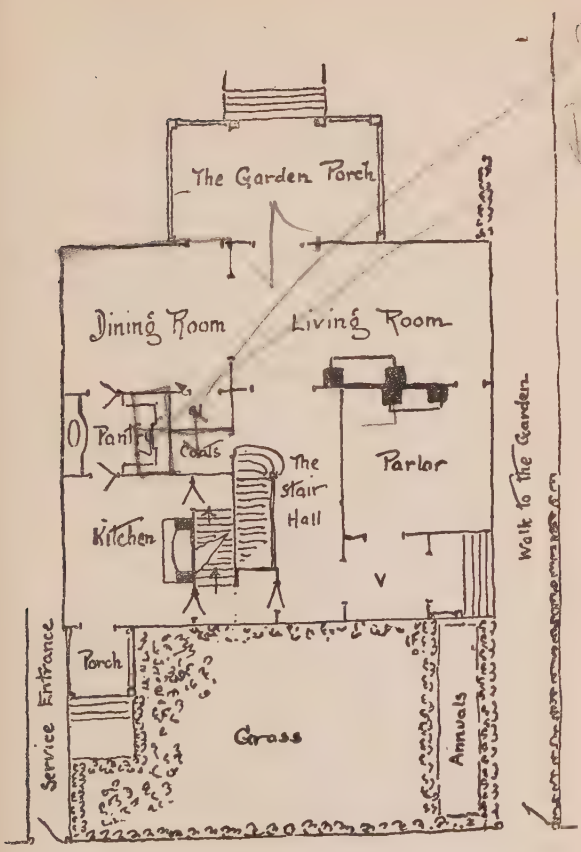

Fig. 17. Fifty-foot lot, plan of the ground floor.

be regarded as the normal lot for country and suburban districts where it is intended to promote building of suburban houses.

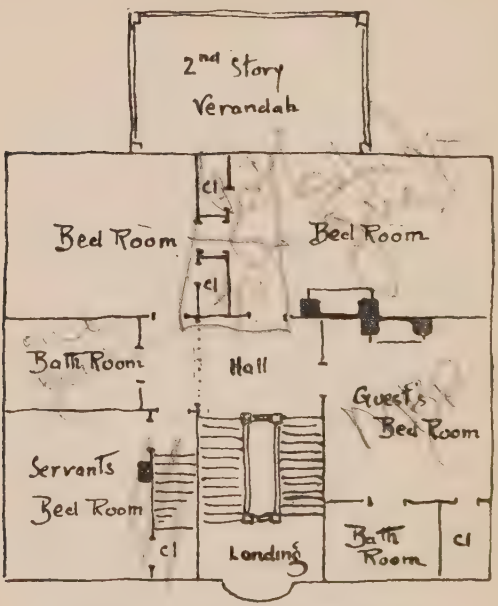

Fig. 18. Plan of second floor.

A WIDER SUBURBAN HOUSE

Figures 17 and 18 show the plans of a suburban lot 50 feet wide but with several unusual conditions. This will serve as an illustration of the way in which such condi-

tions may serve to increase the value of the lot if they are favorable, or may be minimized if unfavorable.

In this case the adjoining lots were wider, and it was possible to build the house with a frontage of forty feet, over all. In order to keep the grass plot the maximum width, the service and family entrance paths have been placed alongside the fence lines on the opposite sides of the lot. Moreover, it should be noted that this house fronts to the north: an unfavorable aspect except that it made it easy to carry out the owner's wishes that the ornamental flower garden should be in the rear of the house, with the principal rooms on all floors facing in that direction.

The plan accordingly conforms to these conditions, and should be regarded as a solution of a special problem. It is here shown for the purpose of indicating the important principle of making each house meet the special conditions which arise from the peculiarities of ownership and site. If the additional bathroom on the second floor is not required it could be omitted, and the space so occupied either thrown out of the house altogether by roofing over the verandah and porch at the first story, or the whole thrown into the room

marked "guest's bedroom." The expense would be about the same either way.

On the third floor, two family bedrooms were provided on the south side of the house overlooking the garden, and the north side of that floor was used for storage purposes. A bathroom was installed on the third floor, but that is a matter for special consideration in each case and, in the present state of the development of the domestic plan, would usually be regarded as an extravagance. The laundry in this house was in the basement with a rear entrance and walk screened by a hedge separating it from the ornamental flower garden and leading to the laundry drying yard in the rear of the house.

A BUNGALOW

Figures 19 and 20 show bungalow plans. Figure 19 represents the bungalow in the first stage of its existence and figure 20 shows how the original house was preserved and made to form a nucleus for a larger one to meet the increasing family's demands. Such a house as this would be well enough adapted as an all-the-year-round residence, but east of the Mississippi it would probably be built only for summer use.

The materials used for the outside walls would depend upon the local conditions, and should be made to conform to them as closely as possible. Most satisfactory effects will as a general rule always be obtained if local material be used, especially in country houses, unless they be of the most formal type. In this latter case exceptions to the general rule are sometimes advisable, but they remain exceptions and should be made only for pressing reasons.

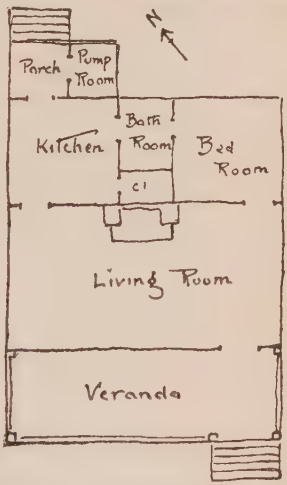

Fig. 19. Plan of Bungalow, first stage.

For such a bungalow as this in a heavily forested region the most appropriate material would be logs hewn to fit, with the bark left on; the interior partitions being finished in the usual way. Foundations should be of field stone with the interior chimneys of brick if these are easily procurable; otherwise of stone. Special circumstances might render it advisable to build such a bungalow of reïnforced

concrete, in which case the exterior walls should be whitewashed. Water should be supplied to the house from an elevated tank in order to get the necessary pressure for the

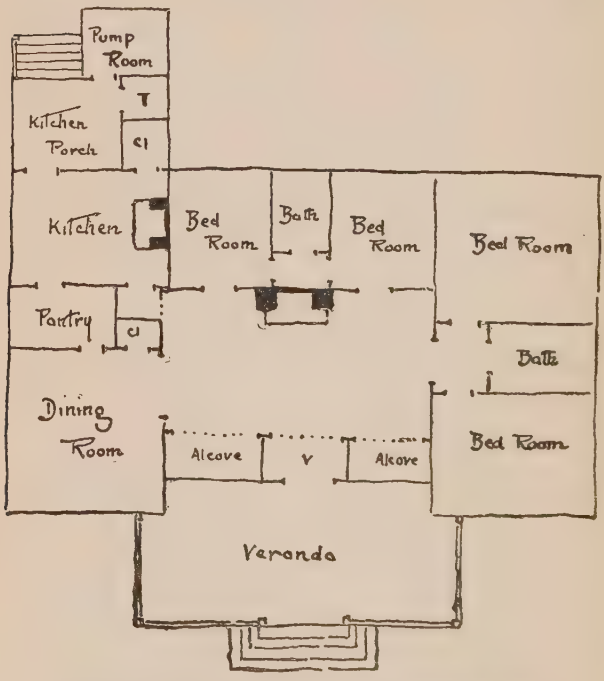

Fig. 20. Plan of a Bungalow, second stage.

plumbing apparatus, the tank itself being filled by a ram, if stream conditions are favorable; a windmill; or an engine driven either by gas-

oline or hot air. The hot air engine is satisfactory provided the services of someone are available to give it frequent attention, otherwise it cannot be recommended. If a hot air engine is selected see that it is of ample capacity, as there is a tendency to overrate its horsepower.

Considering the house as an agreeable adjunct to the landscape, a windmill would be the most satisfactory source of power; and if it and the tank and the pump room were combined in one structure either immediately annexed to the house or detached from it though still in relation to it (considering both from the point of view of the composition of a picture in the landscape), very agreeable effects can be produced.

It will be noticed in this plan that the dining room is in the southwest corner of the house, contrary to our usual rule. In this case (and the exception holds for all similar cases) the bungalow was intended primarily for summer occupation and the western and northwestern sides are abundantly protected by forest trees from the late evening suns of summer and the cold northwest gales of winter.

The houses whose plans are shown in this chapter must be regarded as types only, be-

cause it has not been possible to enter into specifications regarding those details of site and ownership, which are so essential to a proper solution of every individual problem.

CHAPTER VII

THE HOUSE REFINED

THERE is no word in the English language that has been more abused or that has had more crimes committed in its name than the term "artistic." An Oxford dictionary at hand defines it as "relating to a high degree of art," but its every day meaning appears to be — "something different" and especially something "ornamented." It would be well therefore if it could be tabooed for a generation or so until its proper use might be restored.

Every kind of heterogeneous, incongruous, and ugly combination of objects, in themselves eminently uninteresting and in groups defying all fundamental rules, whether of analysis or synthesis, are popularly regarded as having received the hall-mark of authority when they are dubbed with that much abused term.

SINS IN ART

It is especially in questions relating to the arranging of the interior of the house that the

most abominable sins have been committed in its name. We Americans are greatly interested in art, passing as we are into the third stage of our national development; but lacking therefore, as a rule, an appreciation of two essentials which form the groundwork of all good art — that is to say, good feeling and simplicity. Doubtless we shall overcome this defect in time, but that time would be greatly hastened if there were a more general appreciation of the truth that every agreeable composition in whatever field of art is pleasing in the direct proportion in which it embodies these two fundamental qualities of simplicity and unity.

The very word "art" itself is used so carelessly, because it is regarded as something extraneous, some quality that can be added to a thing already existing.

The greatest periods of art have been those in which the best products of the time have been in a large measure unconsciously "artistic" and men produced things which are now regarded as beautiful because they themselves had an innate feeling for beauty. In these best periods of art there were not two kinds of things; those which displayed the qualities of "art" and those which did not.

There were not two different categories of chairs and tables and knives and forks and spoons; those in one category embodying qualities which to-day would be termed "artistic" and the other lacking those qualities; but, on the contrary, all objects of whatever material they might be made were pleasing, the only difference being that some were simpler than others, some made of less valuable material than others, some had less time and perhaps thought bestowed upon their manufacture than others. Nowadays we have rugs and "art rugs," whatever these latter may be.

SIMPLICITY AND UNITY

Let us proceed to an application of the idea. In the first place the plan of the house and its individual rooms ought to embody considerations which make for genuine artistic effects. Greater feeling for proportion in the dimensions of the room itself, in the widths and heights of its doors and windows, in their position in the several walls — all are fundamental. Only that room in which these matters have been carefully considered will give the highest degree of pleasure, although of course we may do much by unsympathetic

after treatment to nullify the work of the most competent architect.

What is meant by simplicity and unity? Assuming the room, with its bare walls and ceiling and floor and doors and windows, what shall we do with it to make it habitable? Effects are produced here chiefly by two, the qualities of texture and color, although a third, proportion, is not absent. Determine then in the first upon some general color scheme for the room which will pull it together and unify it.

It is astonishing how much can be done in this way to secure repose and even dignity in a room which has been very ill designed with regard to its architectonic features. The worse the difficulties to be overcome the darker should be the tone of the predominating color, and in some cases it may even be necessary to carry a very dark tone of color over walls and woodwork alike in order to subdue riotous elements. A very dark tone for the woodwork and lower walls is, for this reason, especially suitable for a library.

LIGHTING A ROOM

Unity is also better secured in this connection by carrying the principal color of the

room high up on the walls, even to within a foot or two of the ceiling if necessary. Ceilings of course should be, as a rule, much lighter than the side walls. This is especially necessary where the actual lighting of the room must be considered from a practical standpoint, as in libraries, for example, or in other working rooms. In this connection also it may be noted that where it is desired to get a maximum amount of light in any particular room without materially altering the color scheme it can be most readily accomplished by raising the window heads to the ceiling line. If this is done and a light ceiling secured, the increase in the lighting of the room will be astonishing. It is important also that windows should be placed rather nearer the corners of a room, than toward the center since a centrally concentrated light in a room — especially when it comes from one side only — is of all lights the most trying on the eyes. This principle has been fully recognized in Germany, where the earlier idea of lighting school rooms from the left hand side has been abandoned in favor of lighting from two opposite sides of the room, wherever it is possible to secure this.

The dominant color having been deter-

mined, and whether its tone is to be lighter or darker must depend on the consideration suggested above, it is advisable not to introduce another color into a room except after the most careful study of the problem. When in doubt use a lighter tone of the same color or a darker one, for all of the principal objects, including even the carpet or rug. That is not to deny that there is a harmony of contrast which is also agreeable in its proper place, but it is more difficult to do well; while in all cases of doubt and especially where economy is desired it is advisable to keep the color scheme uniform throughout if possible. The pictures of two European bedrooms confirm this point. Such a method of procedure also goes a long way towards securing the second element — simplicity.

By simplicity is meant the avoidance of all diverse objects which will tend to distract one's attention from the primary scheme. The more you break up the composition into small parts the greater danger you incur through such complexity.

The Japanese illustrate this principle very well by hanging only one picture on the wall of the room. We need not proceed to such an extreme, but it is important that the prin-

Two "Art Nouveau" bedrooms

ciple should be observed. Especially avoid cluttering up the room with a multiplicity of entirely unrelated objects; unrelated that is in form, color, and texture — in other words objects forming no part of an agreeable composition. The classification necessary in museums produces results of this kind, but we disregard the unpleasant effect for the sake of convenience in studying the collection. Living rooms, however, should have nothing in common with the museum.

The illustrations at pages 97, 132, and 180 have been especially chosen to demonstrate the truth of this principle. It is not necessary to imitate them to accomplish the results they show of the successful application of the principle. Most of them, indeed, exceed the scale of expenditures dealt with in these pages. But a study of them will clear the mind of confusion regarding such matters, and it can be seen how the value of any composition of form and color is increased by restraint and simplicity, and how the beauty of an object is enhanced by isolation against a sympathetic but much subdued background. Germans and Austrians have studied Japanese art to good purpose. They have not copied it, nor need we copy these Teutonic examples;

but these people have seen what its fundamental ideas are, and their value, and have applied them to European use. We might do the same, but for the present purpose, probably more immediate good will result from a study of the work of the adapter rather than of the originator. The illustrations are especially commended to those worthy people who cannot understand why a collection of interesting objects is not, of itself, necessarily interesting.

DECORATING ADJOINING ROOMS

The decorative treatment of adjoining rooms may next be considered. Whether such rooms should be brought together by using the same color scheme for both or a different one for each may be determined partly by local circumstances and partly by individual taste; for example, in the plan shown in Figure 8, (see page 85) the small entrance hall may well be treated by itself.

The general rule for entrance halls should be simplicity in the decorative details, with quiet colors of a darker rather than a lighter hue and with few decorative adjuncts, such as pictures or other objects, on the wall. In

this case the reception room might very well be treated in white or cream color somewhat in the Louis Quinze fashion.

Reception rooms, although reserved in one sense for a subordinate use, should never have the appearance of having been neglected in the decorative scheme. They may always be treated in as dainty though simple manner as may be desired (and simplicity here is always advisable), the basic idea being that while they are to be reserved principally for receiving casual visitors one should not be given the impression of discourtesy by having this particular room neglected or slighted in its decorative treatment. On the contrary, a feeling of resentment, however slight, at not being taken into the more intimate family rooms will be avoided if the parlor in which visitors are received is agreeable and carefully treated and generally good to look at.

In the same plan and in all similar cases where the house is small, it would be quite proper to make the most of the combined areas of the stair hall and dining room by employing the same color scheme for both. This will avoid emphasizing the fact that they are in reality only small apartments and give to the lower floor of the house an air of relative

spaciousness. In a larger house, however, it would be perhaps better to treat them separately.

COLOR FOR HALL AND DINING ROOM

If the stair hall were really large and amounted to a family lounging room there would be no objection to keeping the colors rather dark and low in tone even if the apartment were not very well lighted by its windows. A dining room is always better treated in low tones, with the wall color carried up perhaps quite as high as the doors and windows, and a plate rail or some similar dividing line at that level. The ceiling tone should be light if the surface is unbroken. In dining rooms in large houses which show deep ceiling beams there is no objection to having these beams very dark in tone and the intervening panels even may also be kept dark or a contrasting color may be used if desired.

The reason why dull tones rather dark in hue are applied to a dining room is that they from the best possible background for the dinner table and the gowns of the guests on festive occasions. This also throws into brilliant relief such porcelain or china as may

be displayed on the walls or in the cupboards and the silver on the sideboard. Mahogany, or walnut when it can be had, seems the most suitable wood for the dining room furniture for a similiar reason and the seats, if upholstered, should correspond in tone.

If there be a drawing room in the house which is used in the sense of the old drawing room, that is an evening room into which the family withdraws after dinner, a light tone is desirable.

COLOR AND TEXTURE

So far as colors in general are concerned, there are no unsuitable colors. That is to say it cannot be declared that blue or yellow or green are more suitable for domestic use than red. This applies to bedrooms as well as to the day apartments. It all depends upon the tone of the color used. There are ugly reds and agreeable reds, and a tone of red may look well in one place and prove very disagreeable in another, and so of all the other colors. It is quality of color that counts, always.

Then there is texture to be considered, a term which refers to the mechanical finish of

the surface; whether it be smooth or rough, plain or marked off into patterns.

For libraries a quiet dark tone is best, as has already been suggested, both in the woodwork and on the walls and floor. The family living room which takes the place of the drawing room in small houses and is used as a common meeting room both by day and night, should be treated in cheerful colors, so chosen as to look well both by daylight and by artificial illumination as well.

THE FLOORS

As regards floors generally the rule should be either to show the natural woodwork varnished or waxed, so far as it is shown outside the floor covering, or to cover the floor entirely with carpets, rugs, or matting, so that the wooden floor is not seen.

Never paint floors under any circumstances, as it is impossible to keep a painted floor in good condition. A very charming effect may be had by showing a margin of the lighter toned Japanese or Chinese mattings around the edge of the room, covering the center with a rug. Such a rug might well show the prevailing color of the side walls in two tones,

while the matting and the ceiling may show a second color if desired. As a background for pictures it is of course well understood that the wall should show no pattern in the paper, or whatever the covering material may be; or at any rate if there be a pattern it should be an exceedingly small and inconspicuous one, so that it is really used for giving sparkle and texture to the surface rather than for showing any well defined design in itself. It the Mid-Victorian period, long since happily passed away in the world of art, carpets and rugs showed most alarming designs. Trellises with roses climbing about them, for example, gave one a feeling of great insecurity while walking across the floor. Such patterns are no longer seen, and it is advisable to keep the pattern of the rug in subdued tones whatever they may be and the simpler the pattern (as a rule) the better.

The matting border above referred to is particularly suited for bedrooms and with white or lightly tinted ceilings, the ceiling color carrying down to form a wide frieze, with a paper, let us say, showing blue and white effects in simple designs with a white or cream colored matting on the floor, showing blue spots formed by some geometrical pattern at

infrequent intervals and a simple blue and white rug over the floor in the middle of the room. This makes an exceedingly agreeable combination.

Equally pleasing effects can be had in yellows or greens, or even in reds if the reds are kept rather dull.

DRAPERIES

As for the general question of hangings it is not possible to lay down any general rule, except that in such apartments as are kept quiet and simple in their color treatment the hangings should not display large figures, especially if in strongly contrasted colors. A better effect is usually obtained with all draperies if they are allowed to hang in straight folds rather than when looped back. This makes for simplicity, although there is no real objection to looping back if there be a preference for that method of treatment.

Brass rods now so commonly replace the older fashion of wooden rods that it is perhaps unnecessary to counsel their use. Dull brass or dull bronze effects both for the curtains and the rings are more agreeable than the brighter varieties. It is far better to err

on the side of few rather than more draperies, especially about windows, while the old fashioned lambrequin is not to be recommended, although there are some signs recently of its revival.

The general fault with most hangings is that they are too narrow for the opening and attention should be paid to the rod lengths to see that they reach well beyond and that ample stuff be used so that the curtains will come together without leaving gaps at the jambs of the doors or windows when they are pulled.

FURNITURE

As to furniture in general, its first requisite should be that it is suitable and comfortable. Second, that it be simple in its outlines, unless one is going in for the extravagances of the Louis styles, when archæological considerations permit some departure from this principle. It is highly desirable if any agreeable effect is to be obtained that all furniture in the room be of the same color, and that the upholstering materials do not clash with the color scheme. Morris furniture has the great disadvantage of being cumbersome and heavy and may very well be replaced in most in-

stances by the newer fashion of wicker furniture which is now being made on pretty much the same lines and is infinitely more agreeable to handle and, as a rule, to look at.

BEAUTY DOES NOT MEAN EXTRAVAGANCE

There is a popular obsession that art and extravagant outlay are synonymous terms. The simplest materials are beautiful when properly made up. The manufacture of rag carpets and rugs is now getting into competent hands, and some very agreeable color effects in this humble material are to be seen in the shops. The cheapest wall papers, too, sometimes give quite delightful effects, if due care be taken in their selection, and there is no reason why inexpensive furniture should not be made equally pleasing, as indeed some of it is.

Innumerable offenses against good taste are caused by the passion for bargains. Remnants of expensive materials are seized upon, if offered at considerable reduction, taken home and worked up into all sorts of offensive objects which have no relation to the room in which they are placed.

Although there is a revival of the vogue

for wooden beds, some of them being manufactured in very expensive patterns and looking very satisfactory in the shop windows, they are better avoided for reasons which will be well understood. Brass beds, in simple patterns devoid of sharp corners and knobs, are more agreeable and sanitary.

If one can afford it, it is worth while to tile for at least four feet the side walls of the bathroom, and the floors should at least be covered with linoleum. A bath rug dark in tone and of a dull hue, in some dye which will not come off on wet feet, should be placed on such floors. Tiled walls in the kitchen are of course the ideal finish, but if these cannot be had linoleum can be substituted on the walls to very good advantage. Care must be taken, however, that it is laid by an expert, otherwise it will buckle and tear away from its fastenings. Denim in various hues and tones makes an admirable wall covering for bedrooms and may be divided into panels by wooden strips, the expense of this treatment not being very great.

Hardwood floors should receive very careful treatment. The best of all flooring materials is oak both for its wearing qualities and its color. For floors that will have much

hard wear maple is good and not expensive, but clear maple floor selected for color is rather difficult to procure and is scarcely suitable for domestic work. Of the cheaper hardwood floors North Carolina pine is excellent and of better quality than Georgia pine.

HARDWOOD FLOORS

Hardwood floors should be waxed rather than varnished, as the former finish is much more durable, shows marks less, and is easily renewed. Some of the prepared wax polishes such as Butcher's Boston Polish are excellent, but it is well to apply a coat or two of linseed oil and turpentine mixed with a little dryer before the wax finish is put on. This preliminary application brings out the grain of the floor. Better still, before the oil and turpentine is applied a paste filler may be rubbed into the floor, although this is not absolutely necessary. Floors thoroughly waxed and polished by hand will need no further attention for many months to come and a monthly brushing of the wax with some woolen cloth and plenty of elbow grease is all that is necessary to keep it in good condition.

The yellow pine floors and the floors of softer wood, like white pine or spruce, may be stained to good advantage with water stains, but the soft wood floors must be varnished after the application of the color stain. Cheap varnishes should be avoided and it is better to rely upon a good patented brand such as Murphy's, Crockett's or the Detroit or Chicago Varnish Company's products. This should be put on in at least two coats, and if any roughnesses appear they may be gone over with a fine emery paper and smoothed down. If the high polish of the varnish is objectionable the last coat when thoroughly dried may be gone over with a little floor wax polished with a brush.

Even if the principal stairs are of hardwood, a quieter house will be secured if a strip of carpet is put down the middle well secured by any of the ordinary patented stair carpet fasteners.

Kitchen floors on account of the hard usage which they receive should either be entirely covered with linoleum or else treated with hot paraffin well rubbed in, although this entails considerable trouble in its first application. It forms a hard impervious surface which is practically non-absorbent and worn places are

easily renewed with a fresh application on the worn spots.

TREATMENT OF WOODWORK

With regard to the question of woodwork in general, that is doors and window trims, etc., painted woodwork has the double advantage of being inexpensive and flexible as to the color scheme. If the woodwork is of a kind which develops pitch or resinous spots of any kind all knot holes and similar spots should be thoroughly covered with shellac.

Plastered walls of course can be painted as well as the plastered ceilings, but it is very much better to cover them with paper, since this is easily and cheaply renewed. Good oil paint can always be washed with soap and water provided not too much soap is used and none is allowed to dry on the paint. Varnish, of course, should never be washed, though damp cloths may be used.

TREATMENT OF FIREPLACES

With regard to the treatment of fireplaces the most satisfactory in the long run is to have a border of tiles with a wooden mantel.

the latter painted to correspond with the rest of the woodwork. Brick fireplaces and more especially brick mantels always strike an incongruous note both in color and texture in any scheme of decoration and it is almost impossible to harmonize them. Rough stone mantels are still worse in this respect and should be relegated to the log cabin and the summer bungalow.

Gas and electric light fixtures as found in the market are usually ugly and difficult to manage. Only those of the simplest and quietest designs should be used. Those giving dull brass or black iron effects are the best. The latter may be painted if desired, though this should only be adopted as a last resort.

CHAPTER VIII

HEATING AND VENTILATING

HEATING and ventilating are usually considered together, because the only system of ventilation which is applicable to domestic work (except in houses of the most expensive character) depends for its operation on the principle of a body of fresh heated air rising into the various rooms of the house and displacing other bodies of cooler vitiated air. Such a system may be operated either by means of a fresh air furnace, a coil of steam pipes connected with a fresh air intake, or by any other similar and suitable means which will accomplish the same purpose. As regards steam heating, however, ventilating by means of steam heat is unfortunately much more expensive than a system of ventilation by means of a hot air furnace, and the latter therefore is practically the only one which can be considered in connection with houses of moderate cost.

So far as the mere heating of the house is

concerned steam is often more economical as regards fuel consumption than is the hot air furnace, and the system of heating by hot water pipes perhaps even more so. Neither of these two latter systems, however, when used simply and directly, affords the least means of ventilating the house during cold weather, and therefore from a hygienic point of view ought not to be installed if a good furnace with its appurtenances can be had.

THE HOT AIR FURNACE

We may therefore consider first and chiefly the hot air furnace. There are many types of such apparatus on the market, each of which is "the best," but many of which are very cheaply put together and highly inefficient, their use resulting in a large coal consumption with correspondingly heavy bills for the same. Any attempt to install a heating apparatus of the cheaper description is, on every count, a foolish waste of money and the difference, taking everything into consideration, would probably not exceed $100.00 as between the cheapest and the most efficient type of furnace. As this is one of the vital points in a house it is much better to go without something not quite so essential and have the heating

apparatus well made and properly installed.

It must be considered, however, that from a strictly scientific point of view, the furnace is not an efficient apparatus when we take into consideration the relation between fuel consumption and the amount of heat supplied to every room in the house. Although this fault is minimized in the better types of furnaces, it still remains to some extent, and is inherent in the method. Air takes up heat very slowly, and it is difficult to devise any type of hot air apparatus in which all of the heat can be utilized in warming the air of the house. There is always therefore necessarily a large waste of heat up the chimney, although it is not at all certain that the furnace makers have yet reached the limits of economy in the design of their apparatus.

Nevertheless the fact that the house is warmed by means of fresh heated air far outweighs the deficiency of the furnace just referred to and whatever may be its increase of fuel consumption over that of a steam heating apparatus, for example, this excess of cost ought to be regarded not only as being expended for heat but as going a long way toward insuring better health for the entire household.

A hot air furnace consists in principle of a grate, a large combustion chamber over the grate, and a smoke pipe to the chimney to carry off the products of combustion. Around this arrangement is a galvanized iron casing, the joints made as air tight as possible, connecting at the bottom with a large flue or duct leading to the outside air and at the top having several openings through which fresh heated air may be carried from the furnace into the several rooms of the house. The object of making the joints of the outer casing air tight is to insure against the possibility of the drawing of cellar air into the heating chamber.

In its most efficient form the furnace will have a large grate holding a body of coal, sufficient to maintain the fire at the required temperature for several hours without attention, and as large a combustion chamber as possible in order that the incoming fresh air may remain for as long a period as possible in contact with its heated cast iron surface. Sometimes this surface is artificially expanded by what are technically known as baffle plates, which are cast iron fins bolted on to the combustion chamber, increasing its radiating surface and checking the too rapid onrush of the heated air to the distributing pipes.

DEFECTS OF THE FURNACE

The defects to be looked for in furnaces are, first, cheap construction in which the joints about the fire pot and the combustion chamber are very imperfect, allowing to a greater or less extent the escape of the combustion gases into the heating chamber; the using of too weak materials in the construction of the fire pot and heating chamber, which will result in the apparatus having a much shorter life than it should and necessitating frequent repairs to keep it in anything like workable condition.

The second fault to be guarded against is that of installing too small an apparatus. If the landlord is to select the furnace he will always be governed by considerations of first cost, and will put in the smallest possible furnace which, forced continuously to its maximum capacity, will keep the house at some reasonable temperature during the average weather. On extremely cold days such an apparatus will fail altogether, and no amount of forcing will serve to keep the house habitable. It is very much more economical to heat the house by a large volume of moderately warm air than by a small volume of

highly heated air. A large furnace will sometimes burn actually less coal than another one of two sizes smaller and will do its required work much more efficiently. A slow steady fire in a furnace of the proper capacity will always give the best and most economical results.

A furnace adequate in other respects may fail with improper location in the cellar. In such a case and under certain conditions of weather certain rooms in the house cannot be made to receive any heat at all. As the air pressure exerted through the heating of the air in the furnace is at best very slight it is evident that it cannot be expected to do very much work in the direction of that side of the house against which a gale of wind is blowing. When we consider that our coldest days in winter are those in which the wind is westerly and of very considerable force it is evident that the proper location of the furnace is toward the northwest corner.

Of course on every other consideration a central position is better, by making about equal the lengths of the pipes under the cellar ceiling before they start upwards in the partitions to the various rooms. As these pipes must emerge from the hot air casing cham-

ber at its top, and as the cellar ceiling is relatively low, it will be seen that the length of these pipes as they show in the cellar will approach closely to a horizontal position. They must have some rise, of course, or the work of the furnace will be greatly increased. As the space above the top of the combustion chamber is the same all over the cellar it is perfectly evident that the longest pipes will have the flattest slope. For this reason and having regard to this consideration alone, a central position for the furnace with reference to all of the rising pipes in the house would be the best; but this conclusion is modified by the fact just referred to, namely, that the strongest winds against whose force the heated air must to some extent exert itself will come from the northwest.

Only judgment based on experience with heating apparatus can determine the absolutely best position for the furnace in any particular case, but rather nearer the northwest corner than in the center should be the rule.

If the house be large and rambling, and especially if it have one large wing, it is better to install two smaller furnaces rather than one very large one. Under usual conditions there

may be some increase in fuel consumption through this arrangement, but the fact that the house can always be kept warm and comfortable in all weathers should be regarded as adequate compensation for the increased outlay.

In the effort to gain increased distance between the top of the furnace and the cellar ceiling the furnace is sometimes placed in a sort of pit excavated below the cellar floor. This is very objectionable, for two reasons. In the first place it makes it difficult to operate the furnace and keep the fire in good condition; and in the second place, these pits are very apt to be filled with water in case of prolonged rains when the ground becomes saturated, causing the sub-surface water level to rise materially.

When an attempt is made to build a house with cheapness as the first consideration all sorts of defects arise both in material construction and operation, and low-ceilinged cellars always result from an attempt to save on the expense of the foundation walls. This saving on first cost is very delusive, because the increased expense of operation and repairs will far more than eat up interest on the money saved. It is good economy to wrap the

heating pipes which lead from the heating chamber to the vertical pipes in the partitions with asbestos, following this by some good non-conducting material such as thin hair felt or some cheaper substitute. This prevents too active a radiation of heat from the pipes into the cellar with consequent cooling of the air in the pipes before it has a chance to reach the rooms.

Each heating pipe in the cellar should have a valve or damper so that the tendency of any one pipe to draw an undue share of hot air from the furnace may be checked, and by the intelligent use of these dampers, and a little additional time on the part of whoever is responsible for the operation of the furnace, it is possible to adjust them, to satisfactorily meet all conditions of outside wind and temperature. In adjusting such dampers it will be a help to remember that the longer the vertical rise of any pipe coming from the furnace the stronger will be its suction in the combustion chamber and therefore the more its particular damper may be closed to equalize this suction.

PLACING FLUES AND REGISTERS

Pipes rising to the third story will draw much more strongly than those rising to the

second, and those rising to the second will be more active than those which stop on the first floor. It can readily be seen therefore that the ideal layout of such pipes would be to have the longest runs going to the highest floor and the shortest to the lowest floor. This would give a sharper pitch to the latter which would tend to overcome their otherwise weak draft.

Heater pipes as they rise through wooden partitions should be wrapped in asbestos and where they pass through floors should have a double collar with an air space between the two. This will obviate all heating of the walls and abolish any possible risk of fire from this source.

As regards the position of the register faces in a room one rule should always be observed. Never place them in the floor. When so placed they become a receptacle for all sorts of trash and dirt which will char, and may on occasion even take fire. It is useless to go to the expense of providing fresh air and then vitiate it at the point where it enters the room. If doors and windows could be kept closed and an adequate volume of warm air supplied to each room by a properly designed apparatus it would be better to deliver the warm

air near the ceiling and extract the vitiated air of the room in the wall near the floor on the same side, thus ensuring thorough circulation in the room.

All such vent flues, if installed, in order to operate efficiently ought to be united into one flue in the attic and so carried out through the roof, being there protected by an adequate hood or ventilator which will insure against down draft and the entrance of rain or snow. Since, however, the installation of these vent flues is an added expense, and probably therefore would be omitted in any case in houses of the type under consideration, the hot air registers should discharge a foot or two above the floor in the side wall. They should come up wherever possible perfectly straight from the cellar below. The design of these register faces as to finish and color may be made to harmonize more or less with the color scheme of the room. Some attention should always be paid to this point. Registers, and the pipes supplying them with hot air should never be placed in outside walls, as they will become chilled and inefficient. The body of cold air in a chilled flue may easily stop the flow of hot air from the best furnace ever made.

HOW TO TEST THE HEAT SUPPLY

Although it is entirely impractical to give any rules or formulas by which a layman can design or install any heating system in his house there is one rule which may be given for testing the capacity of the heating apparatus. Find the cubic contents of the room and multiply the length and breadth and height together and for any first floor rooms divide the cubic contents by 30, for any second floor room by 35 and for any third floor room by 40. The quotient will give some reasonable approximation to the proper area of the pipe carrying its supply of hot air from the furnace to each room. This rule conforms to average requirements, but for a room having a northwest exposure, an unusual amount of window surface, or any other element which would tend to make it unusually cold in winter, these amounts should be increased by about ten or fifteen per cent. according to conditions.

There is a type of furnace known as the combination furnace which has an auxiliary attachment which supplies steam or hot water to pipes which may be carried to the more remote points of the house, where it would be

impractical to lead the air during stormy weather. If these combination furnaces are properly designed, the steam or hot water is generated by the gases of combustion after they leave the air heating surfaces of the furnace. In this way a portion of the heat that would otherwise escape up the chimney without having performed any efficient work is utilized and considerable economy may be attained by their use.

MOISTURE IN HEATING

The manufacturers of some forms of furnaces have a good deal to say about the water reservoir which they furnish for the purpose of evaporating water into the hot air before it is supplied to the rooms. This is merely what the trade would call a "talking point," and is of little practical importance. Introduction of this water reservoir in furnaces has been due to an imperfect understanding of the exact conditions under which they operate. The supply of intensely hot and very dry air continued for a long period of time is undoubtedly not conducive to the sound health of those who must breathe it. Neither on the other hand is an air supply heavily charged with moisture.

A moderate amount of moisture which would give a relative humidity reading of about forty would perhaps be an ideal condition but, as a matter of fact, the water reservoirs in furnaces are so small that the amount of moisture they impart to the air could hardly be detected by an hydrometer. They are not worth the trouble it takes to maintain them.

Moderately heated dry air is not at all detrimental and that is the normal condition under which houses are heated in winter. If the hot air furnace be of suitable capacity for its use in any particular case, the only real advantage of not having the furnace air too dry lies in the fact that moist air always seems hotter to the body than dry air of equal temperature. It is for this reason that we regard the weather forecaster's report on general humidity with such close attention during the summer weather. If, therefore, moisture could be imparted to the air through some properly designed attachment to the furnace by which might be maintained a relative humidity at about the figure suggested above our houses would seem warmer (which after all is the final consideration) with a smaller expenditure of fuel than is the case when the air is perfectly dry.

THE COLD AIR INLET

It is important that the cold air inlet to the furnace should be strictly air tight and it is best if built of metal and carried along the cellar ceiling and dropped at the back of the furnace to the floor. The old fashioned type of underground brick duct should never be built, and if one already exists it should either be done away with or plastered over with cement mortar on the inside, and the cover stones be put on with cement joints. It is obvious that a cold air inlet to the furnace which leaks will draw air from the cellar in preference to taking it from outside as there will be less resistance in the former case than the latter. Wooden ducts should be lined on the inside with sheets of asbestos, each sheet being well lapped over the preceding one to make an air tight lining.

SLOPE OF FLUES

Eighteen inches is the minimum allowable distance between the top of the hot air chamber and the cellar ceiling if any of the runs of pipes are more than twelve feet long. A rise of about one inch to the foot for the cellar

pipes is the least amount which should be permitted. In inspecting furnaces already installed see that the pipes rise steadily from the furnace to their extreme end. This is especially important in the longer runs of pipes which have the flattest inclination. These will be often rendered quite useless by a dip in the pipe, as this will be sufficient to check the movement of the hot air on its way to the vertical pipe in the partition.

INSPECTING A FURNACE

In making an inspection of a furnace already installed in a house under consideration two things should be specially observed. Open the fuel door and see whether the opening into the smoke flue is directly above the surface of the burning coal. This is what is known as a direct draft furnace and is an old fashioned type not installed at the present day except in the cheapest class of houses. Its disadvantages are due to the increased coal consumption arising from the immediate escape of the products of combustion on leaving the fire, the sides of the heating chamber being warmed chiefly by direct radiation from the fire.

All the newer types of furnaces have an in-

direct draft, which means that the gases of combustion are carried through the entire length of the combustion chamber and back through a down draft flue and then out into the smoke stack. This minimizes the loss from the heat units which escape up the chimney without doing any work as in the direct draft type. Indirect draft furnaces have one disadvantage in that they require a much stronger pull in the chimney flue.

Every smoke flue, of course, should have a check draft opening into the cellar in order to prevent the fire from overheating, as it is extremely uneconomical and wasteful of fuel to check the fire by opening the furnace door. After this point is determined inspect the grate and see whether it is one of the modern type of rocker or slicing grates or whether it is the old fashioned kind which shakes up the fire after a fashion by revolving around a central pin. This type wastes fuel and produces a very poor combustion in the fire, as the shaking action is almost entirely confined to the circumference of the grate and leaves a pyramid of ashes in the center which must be laboriously raked out with a poker. Make sure that the grate has not been "burned out" (melted by the hot ashes allowed to accumulate under it).

STEAM HEATING

Heating a house by steam has this advantage over the hot air furnace that any part of the house can be warmed in any weather. The steam being under pressure (though this should not exceed five pounds to the inch) can be forced to the coldest room in the house and while there must give up its heat in the radiator, and if the latter be large enough the room can be adequately warmed. Steam heating has also another advantage over the hot air furnace in that for the same amount of heat it will burn less coal the difference being on an average about 25% in favor of the steam apparatus.

It has two serious disadvantages, however, the first being it is next to impossible to get any variation of temperature. If the radiators are filled with steam they will always radiate the same amount of heat and it is not possible to partially fill them. This objection can of course be overcome by having two or more radiators in the same room, using one in milder weather and all of them in the coldest weather. This increases very materially the cost of installation, but in the case of large rooms, where it would be impractical to com-

bine all the heating surfaces in one radiator, this objection does not apply.

DIRECT AND INDIRECT RADIATION

The most serious disadvantage from a hygienic point of view is that no fresh air will be supplied to the house unless we use what is known as "indirect radiation." This means that one or more radiators in the cellar are enclosed in an air tight box and supplied by a fresh air duct from out of doors; making in effect a small hot air furnace, in which however the heating chamber is warmed by steam instead of the gases of combustion. As it takes about twice as much radiating surface for an indirect radiator as for a direct, and moreover as there is the cold air flue and the air tight box to be built, an attempt to heat all the rooms in the house by this indirect system will result in a cost which is practically prohibitive for houses of the character now under discussion.

The system may however be partially installed in connection with a direct system by having, say, one indirect radiator for the lower hall which will insure this and such of the upper halls as open into it, a supply of warm fresh air at all times. The individual rooms

in the house however must depend for their supply of fresh air either on leaving the doors into the halls open (which is often out of the question) or by opening the windows.

The force of imagination is sometimes curiously displayed in connection with direct steam heating. It is frequently said by those who understand that the radiators are heated by steam that they prefer steam heat because it makes the air of the house so moist. As a matter of fact no steam escapes into the air of the house except through leaks in the pipes, and of all forms of heating none is dryer than that given off by a steam radiator. Pans containing water are sometimes put on top of steam radiators to moisten the air of rooms, but they are very inefficient and highly unsanitary.

No rule can be given by which a layman can form any adequate judgment of the proper size of either the steam heating apparatus in the cellar or the size of the radiators in the rooms. Most of the heating apparatus in the market (except a few of the cheaper varieties) is, as a rule, properly designed and entirely safe, and the only question to be looked out for is that the heating surfaces are adequate.

In this connection a remark may be made which applies not only to steam heating apparatus but to all other forms, including hot air furnaces. The layman should never buy a furnace or any other heating apparatus, but he should buy *a heating system* from a reputable maker who will guarantee its adequate performance; the usual rule being the maintenance of 70 degrees inside throughout the house during zero weather.

THE HOT WATER SYSTEM

Hot water apparatus for heating houses has a large vogue at present and is much liked, principally because it is quite possible to regulate the temperature of the house by the degree to which the water is heated, which in turn, depends entirely upon the activity of the fire in the fire pot.

Indirect heating can be had by hot water as well as by steam, but it is open to the serious objection that it is almost certain to freeze in case the fire should get very low during zero weather. And then the fact that we have running all through the house a system of pipes filled with water adds greatly to the danger of damage from leakage, which is especially

vexatious and costly in places where repairs are difficult to make without breaking out the walls or tearing up the floors.

As regards fuel consumption, hot water heating has some slight advantage over steam, and of course a much greater advantage over the hot air furnace. Both steam and hot water heaters of the best type are built up in sections, which gives this advantage, that in case a heater installed proves inadequate its capacity can be cheaply enlarged by adding one or more sections to the heater. These sections are made of cast iron, and are bolted on to the already existing work. Such enlargement does not in any way effect the installation of the pipes throughout the house.

There are two types of boilers for steam and hot water. In the steam boilers, we have the low pressure and the high pressure systems; the low pressure working with a pressure of two or three pounds of steam at the boiler while the high pressure usually requires fifteen or twenty. The advantage of the high pressure steam is that we get somewhat greater heating capacity in the radiators and more positive circulation through the pipes. It is dangerous, however, in spite of all precautions, and should never be installed in a private dwell-

ing house unless there be a trained fireman in charge at all times. In hot water apparatus we have the choice of the open system and the closed system. The closed system corresponds to the high pressure steam system and should never be placed in private dwellings.

All hot water systems require what is known as an expansion tank in the attic which is closed in the case of the closed system and open in the case of the open system. The whole safety of the installation depends upon this open pipe never being closed by any accidental or other means. There is not much danger of such closing in any properly installed system, but it is a point which should be taken into consideration.

Steam and hot water systems also are classified as one pipe or gravity, and two pipe, or return systems. In the one pipe system the steam pipe which conveys the steam to the radiator brings back the condensed water to the boiler. For houses of moderate size where this system is properly installed and all of the steam pipes have a steady rise from the boiler to the radiator without any dips or bends in the supply pipe it will work satisfactorily. The one pipe hot water system is similar to that of the one pipe steam system in

principle. Perfect operation, however, is insured by the two pipe system, in which one of the pipes carries the steam or hot water to the radiator and the second pipe is used for the return.

DISADVANTAGE OF THE WATER-HAMMER

One point with regard to the operation of steam radiators should not be forgotten. No attempt should be made to regulate the amount of heat in the radiator by partially opening or partially shutting the supply and return valves. They must be either wide open or tight shut, otherwise the radiator will fill with condensed water and an annoying "water-hammer" will result. Another disadvantage of this direct system of heating results from the extremely ugly form of the radiators, which it appears impossible to mitigate.

Something can be done of course to render them inconspicuous by having them painted with heat proof paint or varnish, of a color to correspond with the wall against which they stand; but no attempt should ever be made to include them in the system of decoration by giving them a different color, or by striping them with gold or the other abomi-

nable practices which commonly result when these matters are left to the heating engineer. In other words the rule should be to make them as inconspicuous as possible.

There is some danger from steam pipes causing a fire, by charring any wood with which they may come in contact. Paper left lying carelessly against them for a period of time will also char, and wherever charring occurs there is always danger of spontaneous combustion; as the charred substance, when it reaches a certain point in its development, may become spongy in character and will then take up oxygen from the atmosphere and may possibly burst into flame. Although the possibility of this danger has been denied on theoretical grounds, unmistakable cases of it have fallen under my own observation.

ARTIFICIAL VENTILATION

The only system of artificial ventilation which is positive in its action is what is known as the fan system. This operates by means of a circular fan or air propeller situated usually in the basement and driven by power—electrical, steam, or gasoline. The expense of installing such an apparatus, however, is en-

tirely too great to render it available for houses of the character under discussion.

The principle to be observed in the operation of such a system is practically this: that the fresh heated air must be forced into the room under pressure and not allowed to find its way in by a reverse system of operation (known as the vacuum system) which was formerly in vogue to some extent, but is now entirely repudiated. The vacuum system is operated by an exhaust fan placed at the terminus of all the converging foul air ducts from the building; the theory being that if a vacuum were created in these it would not only extract all the foul air from the building but draw after it the freshly warmed air from the heating apparatus. This system works all right so far as extracting the foul air is concerned, but the air that flows in to take its place does not always come from the heating system, but leaks in from various other directions, including accidental openings in the sewer pipes.

For domestic purposes and on a small scale, or indeed on any scale, there is no better system of ventilation or perhaps none so good as that to be obtained by opening the windows of the various rooms and allowing the fresh

outside air to come directly in, to a greater or less extent, according to the outside temperature, and the capacity of the person using the room for working and living in a temperate or even cool atmosphere. While it is not wise for anyone to sit in a room that is uncomfortably cold, it is the height of wisdom to accustom oneself to work and sleep in a room filled with fresh cool air.

CHAPTER IX

PLUMBING

In no one particular has the American house shown such rapid improvement in method of operation as has been experienced during the past decade or two with regard to the various pipes and fixtures which are usually included under the designation "plumbing," or "plumbing and drainage." By this or some similar term we mean the apparatus designed to convey pure water into the house and the removal of the various solid and liquid wastes into some outside receptacle, either a sewer or cesspool.

WATER SUPPLY

So far as the water supply itself is concerned, in houses of the character now under discussion, the supply pipes throughout the house, except perhaps those immediately in evidence in the bathroom, will be galvanized wrought iron or steel pipes, the former being preferable owing to their great longevity.

As the size of the main supply pipe will be governed in most cases by the rules of the water company from which the supply is obtained the householder will have no choice in the matter, but where possible the main supply should be at least 1 inch or 1¼ inches in diameter under ordinary pressure, although a ¾ inch pipe is all that is usually permitted by the water company. The object of using the larger pipe is that there may be a plentiful supply to every fixture in the house with low velocity.

When the pipes are too small a faucet opened on the lower floor will check or sometimes entirely stop the flowing of one on a higher floor. The largest pipe ever used to supply any fixture is ¾ inch and this only as a rule for bathtubs, ½ inch pipe being the more usual size. The main supply pipe should have a shut-off at the point where it passes through the cellar wall on the inside of the house.

The supply of fresh water to the various fixtures in the house will be laid off from points most convenient for the shortest runs of branch supplies to each fixture. No attempt will be made here to explain by means of diagrams the proper distribution of pipes

throughout the house because such diagrams, when standing alone, can be of no use to the layman and would probably only result in his forming an incorrect opinion. With regard, however, to the practical details of which he has daily concern so far as the use of the apparatus is concerned, some instruction here will be permissible.

FAUCETS

As to the water supply itself, the chief source of annoyance is usually the faucet. These are made in various patterns, the most elementary of which is operated by turning a lever handle which in one position places a hole in the stem of the faucet in line with the bore of the pipe and in another position, at right angles to the former, presents a solid obstacle to the flow of the water. For hose connections and other places where use of the faucet is relatively infrequent this cheaper type will serve.

It has, however, two rather serious objections. One is that it soon wears out under frequent use and causes leaks, and another is that it is possible by its inconsiderate use in quick closing to very suddenly check the flow

of water. If the water pressure in the pipes is high the shock of this sudden arresting of the flow may cause the pipes to split. This kind of faucet is commonly known as the ground key cock.

The better type of faucet is known as the compression cock. In this, the stem screws up and down by means of a wheel or cross handle and when closed is sometimes, in the better types of this class, held in that position by the pressure of the spring. A patented type, known as the Fuller Faucet, is mechanically correct in principle and simple in its operation, and not so likely to get out of order. It has, however, the disadvantage of closing rather too quickly for high pressure lines.

Self-closing faucets which have to be held open in order to insure a flow of water are sometimes necessary where users of water are likely to be careless of waste and expense to the owner of the house, especially where the water is metered. These, however, are troublesome and for ordinary domestic use are scarcely to be tolerated.

If one is installing a new system of plumbing, care should be taken to see that a cut off cock is placed on the line of supply to each separate fixture both for the hot and cold

water, in order that repairs to that fixture may be made without interfering with the supply elsewhere throughout the house by cutting off the main supply system where it enters the house. If the pressure of the water supply system be high it would be advisable to have the plumber install an air chamber at the highest point of the supply pipe in order that shock to the system may be minimized in the event of the instant closing of a cock. As has already been suggested this would exert abnormal pressure upon the pipes, and is almost certain sooner or later to cause a weak weld to open or a defective fitting to fracture.

The only novelty in the way of faucets to fixtures are the so-called mixing valves that are supplied to bathtubs, shower baths, etc. The object of these mixing valves is to supply, directly to the fixtures, water which has already been mixed from the general hot and cold water supplies. For bathtubs this particular type of valve is not of much importance but for shower baths extreme care must be taken in their selection, in order to prevent the possibility of a shower of scalding hot water. If the mixing chamber type is not used, that type of hot and cold water supply valves for the shower bath should be selected which is

so devised that it is impossible to turn on the hot water without first turning on the cold.

There is one other detail in connection with the supply system, known as the circulating pipe, which will be discussed in connection with the hot water boiler.

PLUMBING FIXTURES

"Fixtures," in a plumbing sense, mean every type of apparatus for the reception of pure water and discharge of dirty water and other household wastes.

In houses of moderate size the fixtures will be kitchen and pantry sink, the washbasin, bathtub, and closet. These may be considered in order. Kitchen sinks, which receive the hardest usage, are in their most economical and durable form made of cast iron. They may be supported on brackets or legs without any wooden casing enclosing them underneath and should be trapped with some form of large box trap with a cleaning screw making the removal of grease a relatively simple matter. A porcelain lined iron sink presents a much neater appearance but under the rough usage of the kitchen will have the enamel chipped off. A wooden draining board with surface grooved

A European kitchen

in converging lines leading to the sink should of course be provided. The pantry sink we have already spoken of in another connection and it does not require any further description.

BATHTUBS AND BASINS

For ordinary and economical use the so-called porcelain enameled iron bathtub is the most satisfactory. The principal annoyance in connection with most bathtubs is that the waste pipe is too small. As this is a matter with which the water companies naturally do not concern themselves great care should be taken to see that it is abundantly large. It should never be less than 1½ inches in diameter and 2 inches would be much better.

Porcelain enameled iron lavatories are very satisfactory and may be had in all types and patterns to satisfy the most exacting requirements. They should not have chain and plug waste but preferably one of the latter types which are operated by a knob in the basin slab.

WATER CLOSETS

Most types of closets now on the market are satisfactory so far as efficiency is concerned,

but what is known as the syphon jet closet has the additional advantage of being nearly noiseless in operation. A good deal of objectionable noise in connection with water closets is due to the noisy operation of the overhead tank, especially in the older patterns of such tanks. Every consideration points to the advisability of spending a few more dollars in the first cost of a closet in getting a low down tank which in combination with a syphon jet closet will be practically noiseless. Where the water pressure is feeble, however, such tanks do not operate satisfactorily. This condition is likely to occur in houses occupying higher portions of the city, or in the upper stories of other houses. If the pressure in the surface main is not sufficient in any case, the overhead tank will be necessary. Where such tanks are used care should be taken to see that they are as noiseless as possible in operation. Sometimes flushing tanks are dispensed with and flushing valves are placed directly from the supply pipe to the closet. These, however, also require for their operation considerable water pressure.

The correct use of these flushing valves, however, demands the following conditions: first, that the supply pipe and valve itself be

of sufficient size to furnish a large volume of water in a short period of time, and, secondly, that they be on a different supply system from that connected with the other fixtures in the building. Otherwise, it might happen that if, during repairs, water were shut off from the building and a faucet on a lower floor were opened water might be syphoned out of the closet bowl into the supply pipes of the house and afterwards discharged through the fixtures on the lower floors.

THE SLOP SINK

There is one other fixture which ought always to be installed if possible, even in houses of moderate size, and that is what is known as the housemaid's slop sink. This is best placed in a small closet or apartment of its own, where the rough work of emptying slops, scrubbing water, etc., can be carried on without unduly disturbing other household arrangements. The cost of the installation of a housemaid's slop sink will be well repaid by the wear and tear which is saved the bathtub and the closet.

Careless housemaids are not above using the bathtub as a slop sink, and one does not al-

ways have confidence in their thoroughly cleansing the tub after such operation. The housemaid's slop sink is in effect a fixture some twenty or twenty-four inches deep with hot and cold water supply, and a waste pipe of 2½ or 3 inches in diameter, so that almost anything in reason may be thrown down with expectation of it passing out through the drain pipes into the sewer.

THE SOIL PIPE

All of these fixtures will discharge into the main house drain, which is commonly known as the soil pipe. With regard to this, only two precautions need be observed. One is that it should be carried full-size out through the roof and there left open: the other, that there be a fresh air inlet opening into it at the end where it passes through the house wall on its way to the sewer. This will insure free circulation of fresh air through the pipe at all times, keeping it in the best possible sanitary condition. The soil pipe in the house itself will become warm from the house temperature, so insuring a continuous upward draft discharging at the roof. It is important that this discharging point be as far away as possi-

ble from any window. Beyond this fresh air inlet there should be an intercepting trap cutting off direct air connection between the house drain and the sewer or cesspool.

Wherever there is a public sewer system the householder will have no futher concern from the point of discharge into the main sewerage system. The cast iron soil pipe should be carried out through the wall of the house and it is advisable that it be continued as far as the sewer. This will cause some slight additional expense, but it will pay for itself in the end, because earthenware drain pipes outside the house wall are certain in the course of time to be plugged up with the roots of trees, necessitating the taking up of the sewer, breaking out of several lengths, and replacing with new ones; the cost of which operation at any one time would more than pay for the difference between the original cost of the cast iron and the earthenware pipes.

CESSPOOLS

If the house be so situated that no sewer is available, recourse must be had to a cesspool. If the soil be very porous and sandy, a leaching cesspool may be built at least 250

or 300 feet away from the house, its walls being laid up with dry rubble and covered over with some sort of perforated top.

In such cesspools the liquid contents will leach away through the surrounding earth for a period of several years and indeed in some cases seems to go on indefinitely. Usually, however, the absorbent action of the soil will gradually cease and a new cesspool will have to be built at some distance from the first and this process will have to be continued indefinitely.

A much better way, and one which is of necessity enforced in heavy non-absorbent soils like stiff loams and clays, is the building of a water tight cesspool, which can be periodically cleaned out by the use of an odorless excavating apparatus, which is usually within easy reach. This prevents all possibility of contaminating any source of water supply through the leakage of this house waste into the surrounding soil.

EARTH CLOSETS

Under some conditions, the most important of which is unremitting and intelligent supervision, earth closets are admissible. These

are, essentially, depositories containing dry, pulverized, absorbent loam, a fresh supply of which is added whenever the closet has been used. When the receptacle is full, or say, once a week, the contents must be removed and deposited on the ground. Usually two receptacles for each closet are in use, one ready to replace the other, as each is removed alternately with its contents. These contents, if the pulverized earth be dry, and freely used, are entirely inoffensive, and serve as an effective manure supply for the larger crops. From a sanitary point of view, the earth closet is really preferable to the leaching cesspool, before described, since the dry earth is not only deodorant but also, to a material extent, a sterilizer. The intermittent flush tank is a device that users of isolated houses in the country would do well to consider, but its details are too technical for discussion here. On this point the advice of a sanitary engineer should be taken.

CHAPTER X

THE HOUSE AND THE GARDEN

THE house and the garden are not two things but one. That is to say, the garden, in developing any scheme for a house, should always be considered as an integral part of such a scheme. It ought to be quite obvious that even though we have planned the house for a particular owner and a particular place, it can be made to present a very incongruous appearance in relation to its site if its immediate surroundings be not harmonious. It is not possible therefore to plan a house unless the shape of the lot upon which it is to be placed and the particular position it is best for it to occupy in the lot are, at the same time, carefully studied. This latter consideration is determined, as has already been suggested in a preceding chapter, by the immediate surroundings of the house as we find them on adjoining properties, or on our own.

This placing of the house in a particular position on the lot determines next the posi-

tions of its approaches; the paths, roads, kitchen yard, and outbuildings, if any. This naturally leads next to a consideration of the lawn, the flower beds, the hedges; their relation to each other and to the house, and their relative sizes. Even when we are dealing with a ready made house, whether rented or purchased, we may add a very material element of interest to the property by the design of the garden, and too much time and thought can scarcely be given to it; for it is thought and not expense which is the more important element of a successful garden.

PRINCIPLES FOR THE GARDEN

The almost infinite number of combinations which may be made with such elements as the outline of the house, the several positions of the approaches, the relative extent of the lawn, the flower beds, and the kinds of flowers, makes it impossible to lay down any general rule applicable to all cases alike. There are, nevertheless a few elementary principles which ought to be observed if we hope to obtain the best possible effects, and especially so where strict economy must be considered.

In arranging the plan of a house for a par-

ticular lot it does not necessarily follow that the proper place for the "front" door is in the front of the house facing the street, or that the proper place for the kitchen is necessarily at the back of the house. In small house plans, where we are endeavoring to produce a result which shall make for the best interests of all concerned, placing the front door on the side next the street often renders a really good plan impossible. In such a case the principal entrance should be placed in an adjoining side of the house.

Again if we have a small lot with a narrow frontage it is a stupid idea to place the entrance path directly in the middle of the lot, since by doing so we break up our lawn into two small rectangles; whereas if the entrance path be to one side we have the advantage of a larger rectangle which, though it be only double the size of each of the smaller ones resulting from the first arrangement, will look much larger and be many more times effective.

THE WRONG PLACE FOR A FLOWER-BED

Another principle of good gardening which is frequently violated is the placing of a flower-bed in the middle of the lawn. There is

scarcely anything that can be done more destructive of simplicity and good effect than such a procedure. Its prevalence appears to be due to the paucity of ideas on the part of those who have to do with the laying out of gardens, their one rule being apparently to place "things" in the middle. On the contrary, it is a rule which may always be observed with safety, that whatever be your principle object make the most of it. Now, in any but the tiniest lots the grass will have the largest area. Let it therefore always be a rule to make this area the maximum possible for any given lot, since breaking it up will invariably produce restlessness, and pettiness in the design. Flower beds may very well be placed to one side or around the grass plot, even in larger lots, if it is desired to keep the stretch of green as unbroken as possible.

HEDGES

Not many years ago a well intentioned movement led to the abandonment of all fences, whether upon the street or between neighboring lots in suburban districts. The desire, of course, was to produce breadth of treatment by a combination of individual in-

terests. The facility which this scheme afforded for the smaller children and domestic animals to wander at large over lots and flower beds has led to its abandonment in more recent years, and the effect originally desired has been produced in a much more charming manner (while obviating all the disadvantages of the former method) by substituting the use of hedges for fences. This gives a large expanse of green unbroken by the harsh lines and variegated colors of fences, and minimizes the fact that the lots are separate compartments. Wire fences, with vines trained over them, form a cheaper substitute for hedges, though less agreeable.

This is not a chapter on the horticultural side of gardening, yet a suggestion may be made here and there with regard to suitable materials for the garden design.

The best all round hedging material is the California privet, and this because of its vigorous habit of growth, its ability to maintain itself under severe pruning and especially because it maintains its leaves during the greater part of the winter. Mr. J. Franklin Meehan, a Philadelphia authority, has noted a case where in his experience privet hedges from twelve to fifteen years of age have been suc-

cessfully maintained in perfect condition at heights under eighteen inches. Generally speaking, however, it is better not to subject a privet hedge to this severe treatment, and its use should be reserved for boundary and screening hedges, such as those between the kitchen yard and the lawn, or the ornamental flower garden and the kitchen garden, and box should be used for the smaller hedges bounding the edges of the walks. Evergreen hedges other than box are difficult to maintain, and cannot be recommended to economical gardeners. Privet has the additional advantage of growing freely under the dense shade of trees and in other places where it would be extremely difficult to maintain any other hedge. For hedges of a moderate height not exceeding five feet the Japanese "Barberri" is extremely satisfactory. Its leaves appear early in the spring, remaining brightly green all summer, and turn in the autumn to a rich and brilliant red; and after they are gone bright red berries remain all winter. Its deciduous character, however, should be noticed, and it will not bear much pruning. It must be set back, therefore, three or four feet from the edge of the path or from the line for which it is to form a boundary. It is very compact in

its habit, and spreads directly above the roots sometimes as much as three and one-half or four feet in thickness.

A rose hedge is possible, especially if *Rosa Rugosa* be used. There are two varieties, red and white; which may be mixed to good effect in a single hedge. These rose hedges are hardy and insect proof and have a bright, close foliage; and when the flowers are gone the bright red fruits are very ornamental.

USE PERENNIALS

For small gardens the main reliance may well be an old-fashioned perennial garden, with a small rose garden as an adjunct if one is successful with that beautiful flower. Annuals, hardy or otherwise, may of course be introduced, but in the small garden it is perhaps not wise to attempt too great a variety of them.

The American fashion of placing the ornamental flower garden between the house and the street, while it has much to recommend it from an altruistic point of view, can never lend itself so thoroughly to domestic interests as the somewhat better English fashion of placing the ornamental flower garden behind

the house where privacy can be secured for it, especially if it be enclosed, English fashion, between brick walls.

GARDEN POOLS

For small gardens there can be no question as to the relative merits of the formal and the informal garden plan. In very large gardens where there is room for both the informal garden has its place, but for small houses on small lots, which must necessarily be arranged with some degree of rank and order, in order to exist at all, the formal garden even on the smallest scale will be found to present the greatest charm. It is futile to affect the wildness of nature on a lot fifty feet wide, especially under the more or less formal conditions of suburban surroundings, such as has been previously suggested.

If running water can be easily and cheaply secured, a pool may well form the center of the garden, and this can be used for growing lilies and other aquatic plants. But usually where economy must be consulted this is impractical. If such a pool be built it must be of concrete and very carefully constructed on a good foundation, otherwise it will settle and

crack. It is highly desirable also that some of the waterproof compounds be mixed with the cement in order that the concrete itself shall be waterproof. This will not add materially to the cost of the concrete and will add greatly to the efficiency of the pool.

A much less expensive method of constructing a pool is possible if the soil in which it is to be placed is clay, or if there be a clay bank in the neighborhood. If the excavation is made in the clay itself the sides may be constructed of brickwork in cement mortar with a coat of cement mortar on the outside. When this coat is hard, clay should be rammed tightly against the outside of the wall before the top soil is put in place. The brick walls should be laid in a trench excavated in the clay bed and the trench well filled with rammed clay as soon as the wall is finished.

Where the soil is not clay, but with clay in the neighborhood, the following procedure may be adopted. The excavation is made in the usual way, the excavated earth being used for grading purposes. The bottom of the pond should be rammed hard after having been dug about six inches deeper than is desired for the finished depth of water. Trenches should be excavated for an eight inch brick wall, and the

bottom and the sides of the trench and bottom of the pond should be covered with well pounded clay not less than six inches on the bottom and three or four inches on the sides of the trench. After the wall is built the trench should be filled with clay; the outside of the wall being plastered with cement mortar and the clay rammed against this as in the preceding case. Mr. Chas. E. Pilling of Lansdowne, Pa., whose beautiful Japanese garden at that place has attracted wide attention, and who has successfully used a method practically identical with the above gives the following rules for success in growing water plants of all kinds. First, a tight pond; second, avoid overcrowding; third, very rich soil.

MAKING A LAWN

Never attempt to make a lawn, however small it may be, by sodding. Having prepared your ground by deep digging and with a suitable loamy soil well manured, sow with a lawn mixture purchased from a reputable seedsman. By this method a rich sward will be quickly secured, which will be free from the coarse grasses always to be found in field or pasture sods, and especially free from

weeds which are so easily introduced and so difficult to get rid of.

GARDEN WALKS

Walks may next be considered. For a flower garden, both as regards texture and color, red brick is perhaps the most agreeable, though, as has already been suggested, it has its defects. To maintain brick walks in good condition two requirements must be observed. They must be dug out to a depth of at least twelve inches, a layer of broken stone or coarse gravel four or five inches in thickness laid over the lowest foundation, and above that either a hard pounded broken stone in small sizes or (best of all) concrete. The bricks may be laid flat or on edge, and will look best if arranged herring-bone fashion with raised brick edges.

If these prove too expensive, gravel walks on a coarse stone foundation are very suitable. Stone flagging may be used where it can be had cheaply, but the most undesirable of all materials for garden walks is cement or concrete where the material shows on the finished surface. They are harsh in tone and color, of a disagreeable texture, and unpleasant to walk on. The expedient of coloring the top coating

of cement is usually very unsatisfactory at best. It is difficult to get the right color, and it does not wear well.

At the point where the walk abuts against the street sidewalk, the hedge may be pruned into the form of square posts or piers a foot or two higher than the general line of the hedge, but wooden gate posts and a wooden gate should be hung at this point to keep the entrance closed. If this is painted a dark green a very agreeable effect can be obtained.

TREES AND SHRUBS

With regard to trees, this preliminary observation may be made — and it applies to the entire garden scheme — do not overcrowd. One tree in a small yard, placed to one side of the lawn, is quite sufficient. Lawn trees should never be pruned, especially on their lower branches, and it is very desirable to place the tree on the north side of the grass plot in order that it may not overshadow the lawn. Small trees on small lots is a safe rule. Around the edges of the lot in front of the hedge, borders of hardy perennials or hardy ornamental grasses are extremely effective. An air of spaciousness is given to the lot by

irregular planting about the borders, but care should be taken to avoid the absurdly regular-irregular line so dear to the uncultivated gardener.

With regard to vines, especially for growing about verandahs, honeysuckle will always remain a favorite. Morning Glories, the Ampelopsis, and the Japanese Hop give charming variety. For a short period in the early summer Clematis gives a splendid effect, but the brief duration of its blossoms is its great drawback.

So many garden books have been written that it seems useless to add to their number. Two books that can be especially recommended are Ely's "Hardy Garden" and Professor Bailey's "Garden Making." Parson's "How to plan the Home Grounds" is a useful book, and Shelton's "Seasons in a Flower Garden" may be added to the collection. For entertainment combined with sound instruction perhaps the most amusing garden book ever written is Eden Philpott's "My Garden." Being written in and for England, however, many of its instructions are inapplicable here. It should be on the shelf of garden books, however, for its entertaining qualities.

A CITY FRONT YARD

The problem of the front yard of a city house is most difficult to deal with, owing to the very limited space and to the exceedingly unfavorable conditions; of which, indeed, the

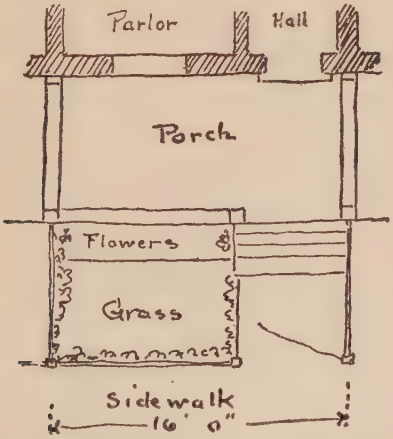

Fig. 21. Treatment of a small front yard.

limited space is itself one. It is often difficult to get direct sunlight if there be trees in the street, and the presence of these trees with their roots, which multiply enormously in their desperate struggles to extract nutriment for the tree wherever it can be found, make it almost impossible to retain enough nour-

ishment for either grass or flowers. Care and patience, however, will do wonders, even under the most unfavorable conditions, and if householders would have due regard for their duties as members of the community, among which is always included helping to render the street on which they live as attractive as possible to the eye, such efforts would be more commonly made than they are at present.

This lack of effort is due partly to the feeling that the space is too small to do anything with, and partly to ignorance on the part of the urban dweller with regard to floriculture. Hesitation on the part of dwellers in small city houses is sometimes due to the idea that nothing can be accomplished without a serious expense. This is a great mistake, since a few dollars a year will cover the entire cost of the operation after a favorable soil is once established, and this latter requirement can be met by a little personal exertion on the part of the members of the family in digging operations and in bringing home rich soil from the woods.

TREATING A SMALL SPACE

Sometimes the available space in front of the house consists of nothing more than a

strip of earth, perhaps thirty inches wide, between the house wall or the porch and the pavement. Even here something can be done by maintaining grass which can be made to grow by unremitting attention. In figure 21 is shown a condition not at all uncommon in Philadelphia and other cities, and though the whole position would seem absurd to the rural householder a truly charming effect can be produced by care, even in such a little space. And if adjoining householders will combine for the betterment of their block, as they may easily be induced to do by a little effort, the result of uniting the adjoining properties in this effect makes all the difference between a dull and monotonous street and one which may be a delight to the eye, even though it is all on so exceedingly small a scale.

The actual available space of all of the gardening operations in front of the house in this particular case, which as has been said is not at all uncommon, gives a plot of earth about seven feet wide and about eleven or twelve feet long. Even smaller plots than this may be frequently met with where equally as good results have been obtained. Assuming that we have either an easterly, a westerly

or a southerly exposure for the plot there should be no difficulty in carrying out this scheme. With a purely northerly exposure it must be confessed that the results would be doubtful; still it would be worth while to try even under so discouraging an aspect.

Along the front edge of the porch a flower bed is made which is two feet wide. This should be dug out to a depth of at least sixteen inches and filled in with rich loam mixed with the top soil from the woods, though eighteen or twenty inches would be still better. The lower portion should be well tamped down, the upper portion being left in a less compact condition. In this, at one end of the bed, may be planted a honeysuckle, at the other a rose bush; the rest of the bed can then be devoted to any particular form of flower culture which most appeals to the owner of the garden. Four or five other rose bushes may be set out of varying colors and habits, one of them a climbing rose, which with the honeysuckle can be trained over the front of the porch, forming an agreeable screen from the street.

Light wire fences screen the garden from the street and separate the adjoining lots

Against the front fence should be planted a privet hedge, which should be kept well pruned back so as not to rise more than two and a half or three feet high except immediately at the gate posts and on the dividing line between the lots.

One or two flowering vines may be trained against the dividing fence and the rest of the space devoted to the grass plot. This should be dug over to a depth of at least twelve inches and filled up with rich loam well interspersed with well-rotted stable manure. On this should be thickly sown a trustworthy lawn mixture and every winter stable manure scattered over the plot.

When the grass is well started it should be kept well wetted; a thorough sprinkling every night during the dryer seasons being steadily kept up. The whole expense of this operation from the time one begins to make the garden until the first results begin to show need not exceed ten dollars, and the annual cost of maintenance less than half that sum. The result in the enjoyment which can be derived from its bright and always charming aspect will be fully worth many times that expenditure.

THAT "BACK YARD"

It seems strange, when one reflects on all the possibilities of the case, that the chance of having a real garden in connection with a small city house should be so entirely overlooked in our modern American practice. This is due to the fact that the street front is regarded always as the important front, all our architectural efforts being exhausted upon this façade, while the back is left to take care of itself, and the back yard is a receptacle for the garbage can, the ash barrel, and the clothes lines. The total result of this policy is that our houses are, as Baillie Scott says, "best described by the phrase 'Queen Anne in front and Mary Ann in the rear.'" [1] Even if a single householder undertook to reverse this practice the result could not be but beneficial, while if it were the universal practice the city garden and the rear rooms in a city house could be made exceedingly attractive, all of the best rooms in the house would be quite free from city noises and dust and would have an outlook on an ample expanse of green grass and brightly colored flowers.

[1] *Houses and Gardens*, p. 98.

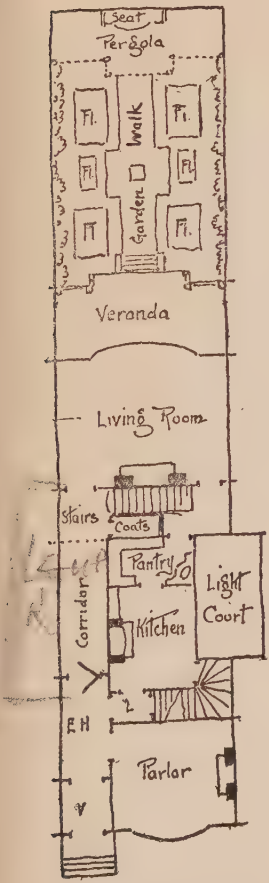

Fig. 22. Plan of the ground floor and the garden.

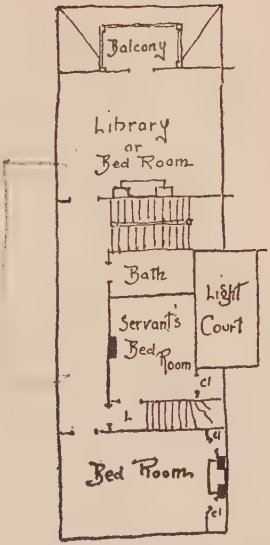

Fig. 23. Plan of the Second Floor (third floor similar).

Of course such an arrangement would be less possible for houses placed on the north side of an east-west street because for a greater part of the day a portion of the garden at least would be in the shadow of the house but even here by a little cleverness in placing most of our flowers could be placed at the further end of the garden entirely in the sunshine. Figure 22 shows the ground floor plan of such a house with its garden on a lot 20 feet wide and 100 feet deep and figure 23 shows the second floor plan of the same house. The plan has been modified from Baillie Scott's suggestion to meet American conditions.

A GARDEN PLAN

This plan has certain merits and defects. The most obvious merit is the one we have striven to attain, namely a garden on which the principal rooms of the house face. It will be observed that the interior rooms are lighted from an enclosed light court open to the sky, but the rooms which open on this are the kitchen, pantry, the principal and servants' stairs, the servants' bedroom, the bathroom on the second floor; to which would correspond a

small family bedroom and storeroom or additional bathroom on the third floor. The large rear room on the second floor could be used if desired as a library or as the principal bedroom, according to circumstances, and a second story verandah overlooks the garden. The living room combines the functions of drawing room and dining room, as has previously been suggested. The laundry is in the basement.

The chief problem would be with regard to drying the clothes. If a drying room (such as is found in most apartment houses) could be installed and this is always possible at a moderate expense, this might do, but for housekeepers who prefer to dry their clothes in the open air there is no alternative but to arrange lines in the garden, which must be therefore devoted to the clothes drying operations for the major portion of one day in the week. Back stairs go up from the kitchen to the servants' bedroom on the second floor which, it will be observed, is well isolated from the family rooms, and the stairs to the basement go down from the small lobby in the kitchen, which also gives access to the front door, a very convenient arrangement.

A ROOF GARDEN

Perhaps a better solution of the laundry difficulty would be to place that room on the third floor over the servants' bedroom, and arrange for drying clothes on the roof. This would take the whole operation out of sight and sound and would utilize the roof for one of the many purposes for which it is so admirably adapted.

The neglect of the opportunities afforded by the roofs of our city houses is lamentable. By carrying up the parapet walls to a sufficient height, say five or six feet, entire privacy can be had; and the roof could be used as an open air day room during the warmer portions of the year, as a playground for the children, and as a sleeping apartment for those appreciating or requiring the open air treatment, now so vigorously advocated by hygienists, for every member of the family, sick or well.

The roof can be arranged in a very attractive manner with permanent seats, and a portion of it could itself be roofed over by carrying up the side walls a few feet higher, leaving one side entirely open to the air, so that even on rainy days it would be available. Flowering plants can be grown in pots, tubs, and

boxes; and an excellent semblance of a garden maintained — the whole proving exceedingly attractive at a very small expense.

When we consider that the most serious drawback to city life is the lack of opportunity for fresh air it is really astonishing how the possibilities of the roof have been overlooked.

BAD GARDEN SOIL

Among the other discouragements with which a gardener who has moved into a new house in the city has to contend not the least is the abominable character of the soil for the garden, which is made up of all the refuse left from building the house. As Eden Philpott says,[2] "It is customary to take all the débris that the builders rejected, or spoilt, or wasted, and arrange it in heaps outside. It is then dusted over with the stuff dug out of the foundations, and called flowerbeds. But bits of brick and lead piping, zinc roofing and sawn wood, broken glass and broken slates, shavings and mortar, lumps of putty and dregs from the soldering ladle, do not make a flower bed. You may even spread a mulch of broken

[2] *My Garden.* Introd., p. 9.

drain-pipes, fragments of wall paper and scourings of paint-pots, upon these foundations, and yet produce no plant food worthy of the name. To grow plants, we must have soil; and if you are going to be contented with any substitute, you may be wise, thrifty, and sensible, but you are not a gardener, and should never pretend to that proud name."

Under such conditions there is nothing to do but have the garden plot excavated to a good depth, and this rubbish carted off and replaced by a good garden soil; after that all is plain sailing for those who have the gift of gardening, but the trouble is worth while.

CHAPTER XI

A STITCH IN TIME

ETERNAL vigilance is the price of economy, and it must be a vigilance that operates in both directions; first, in seeing that no unnecessary expenditures are made, and, secondly, in making expenditures the instant the necessity for them is established. This latter principle is the true secret of economy in house maintenance. As soon as anything about the house gets out of order, or shows premonitory signs of doing so, it should be at once repaired or replaced, because if the smaller things are neglected their impaired functions soon involve other interests, and an ever widening circle of deterioration results.

INSPECT YOUR HOUSE FREQUENTLY

Every house owner should make a systematic monthly inspection of the house both inside and out, and it would be the best of economy once a year to go over the house with the car-

penter, mason, and plumber, in order to determine whether any major repairs are actually needed.

Impending disaster can be discovered and promptly averted by the expert inspection of these mechanics, and it is always possible to find an honest carpenter or an honest mason or an honest plumber in spite of a prejudice to the contrary who will not recommend repairs that are unnecessary. At any rate the common sense of the householder will serve as the necessary balance wheel when repairs are advised. Inspection of the house to be effective should be systematic.[1]

We have already seen in a preceding chapter how such an inspection should proceed for the exterior of the house, and for the interior where repairs are usually the more expensive it should proceed systematically from attic to cellar room by room or if it will not consume too much time it will probably insure a more effective inspection if the house were gone over several times — plastering first being scrutinized, woodwork next, painting and glazing next, heating apparatus next and plumbing last.

[1] A book dealing adequately and minutely with the subject matter of this chapter is T. M. Clark's, The Care of a House. New York. Macmillan, 1905.

Although numerous suggestions were made about maintenance and repairs in the chapter entitled " How is the House built," some additional suggestions may well be given here.

CRACKS IN WALLS

Cracks in plaster may result from two causes: a fracture of the wall against which it is placed, or a local fracture, affecting only the plastering itself. The former of these has already been discussed and is to be regarded of course as merely a local symptom of a more serious disorder. That a crack belongs to this category may be ascertained by examining the exterior of the wall to which it is attached or if this be not possible (as may sometimes happen in the case of party walls) by tapping on or pushing against the plaster in the immediate neighborhood of the crack itself. Where the wall behind it is cracked the plastering will usually be found sound and firmly attached to the wall except over the crack itself. Where the crack however arises from a condition of deterioration in the plaster, the plaster in the immediate neighborhood of the crack will also almost certainly be found to be loosened from the wall behind. In such

a case it is only a question of time how soon it must be cut out in a larger or smaller patch according to circumstances and replaced by new.

Where plastering is placed directly upon brick walls it is not likely to become detached, unless either the plaster itself or the workman who put it on the wall was distinctly inferior. Detached and bulging plaster is more likely to occur on wooden laths, where it arises from the fact that the "key," clinch, or hook-over of the plaster behind each lath was either originally imperfect (owing to unskillful workmanship) or because the clinch originally formed has become broken, either because the plaster was of inferior quality or because (as more frequently happens in the case of a ceiling) there has been unusual movement on the floor above. In any event, whatever the cause there is no remedy but new plaster.

LEAKY PIPES

Plaster on walls or ceilings may also become loose through leakage of water from roof tank or pipes and if the leakage has been large in quantity at any one time, or long continued for a smaller quantity, the plaster is certain to

become detached sooner or later. It is therefore wise to make the repairs at once if the leak has been stopped, provided it is made certain that it will not occur again. Pipes running under the floor would be usually repaired by taking up the floor rather than tearing out the ceiling below, but even in this case it would be wise to renew so much of the plaster as shows a water stain. It is leakages of this description which make a hot water system in a house so undesirable, especially when the walls and ceilings have decorations of any expensive character upon them. Hundreds of dollars worth of damage of this character has been caused by a single leak in a hot water pipe.

LOOSE PLASTER

Loose plaster on a ceiling, it is true, has a marvelous capacity of maintaining itself, even for years, but this only results when the original plaster was of the very best character with plenty of first class cattle hair mixed with it. Nevertheless it is always liable to come down at any moment, and usually without warning, with serious resulting injury not only to "property" but to "person."

Sometimes on a ceiling, where the plaster-

ing has become detached in this way, it is not always possible to detect it with a certainty by the eye alone, but if a straight stick several feet long be placed against the ceiling it can easily be detected.

One should always make sure, however, that places which the stick would indicate as bulging are really loose and not due to gross carelessness in forming a straight surface on the part of the plasterer. This certainty can be obtained by pushing against the suspected spot. If it proves firm and solid and does not give under the pressure it may be regarded simply as a high place left by a careless plasterer.

Plaster on wire lathing or metal lathing of any sort is not likely to crack or become detached even though the wall behind it should be seriously fractured; but metal lath unless galvanized or painted before the plastering is put on, is likely in the course of time to cause iron rust stains which will show through the paper, paint, or other decoration.

Shrinkage cracks are another type. These occur in wooden houses and are due to the drying and shrinkage of the timbers which either form or support the wall or partition. In such a case while the wooden partition itself is not actually fractured it is thrown out of

alignment either vertically or horizontally and so of course fractures will occur in the plaster.

Such shrinkage cracks will cease in the course of a year or two and the best treatment for the plaster in such case is to effect temporary repairs by stopping up the cracks with plaster of Paris and when the movement has ceased if there is a considerable fractured surface it had better be cut out and replaced. It is on account of these shrinkage cracks that it is always better policy in a new frame house to postpone any permanent system of decorating the walls for at least a year, resorting either to calcimine, or the cheaper grades of wall paper. After the movement has ceased, or at least greatly diminished in its scope, permanent decorations can be proceeded with.

ROTTING WOODWORK

Reference has already been made to the repairing of exterior woodwork. Rotting woodwork will occur either through leaks or, possibly, from inherent and original rottenness in the wood itself. What is known as dry rot is the most serious, because this is likely to effect the entire stick of timber; and as it is in-

fectious, it will, unless checked, spread to the adjoining portions of the wall partition or floor. Such timbers, when detected by exploring with a knife blade or tapping with some hard substance, should be removed, together with any adjoining parts which seem to be also infected, and replaced by new and sound stuff. Dry rot in a floor is a more serious matter, because it may proceed until the whole floor is affected, causing a collapse. When therefore any floor shows undue springiness, as if it were unable to bear safely the weights ordinarily placed upon it, it should be examined with the aid of a carpenter and sufficient inspection of the floor timbers made to satisfy oneself that the floor is not becoming progressively weaker through dry rot. Such springiness may of course arise from the fact that the floor beams are too small for their span; a defect very common in cheap houses and one resulting in a lack of stiffness in the floor with consequent serious cracking in the plastered ceiling below.

Such floors are not necessarily in danger of collapsing unless some unusually heavy weights be placed upon them, such as a crowd of people or a very heavy piece of furniture, or a piano, or safe or other similar object which

concentrates its weight upon a relatively small floor area.

Ordinary exterior woodwork may be protected for many years if sound by having the painting renewed at sufficient intervals to keep it in good condition. The frequency of such intervals will be determined by the original character of the paint.

PAINT

Cheap paints require renewing almost yearly while the best quality of paints will last for four or five years unimpaired. It should be noted, however, that woodwork does not, if on the exterior, need to be painted to preserve it. There are many old and unpainted houses, and roof shingles which often have no preparation on them at all will last for a long series of years if the wood from which they were cut was originally sound. Moreover it should be noted that the painting of woodwork from which the sap has not thoroughly dried out is certain to cause decay, which will probably take the form of dry rot and proceed very rapidly to the entire destruction of the piece affected.

Woodwork to remain sound must be freely

exposed to fresh air, and the painting of green wood excludes all air and permits the fungi which produce decay to develop with astonishing rapidity. It is not dampness but lack of fresh air circulation which is the chief enemy of all woodwork used for building.

As is well known sticks of timber completely immersed in water will not only last for many years but actually improve in quality. A long timber which was known to have been immersed in fresh water for sixty years has been brought out and used for years afterward as a stringer piece for a dock. It was of white oak and after its sixty years of immersion was almost as hard as iron. Timber piles under water will last for many centuries. A piece cut from one of the piles under the famous Campanile at Venice which was known to have been down for six hundred years, was quite as sound, and probably much harder, than when first driven. The question of renewing the paint and varnish on interior or even exterior woodwork is therefore chiefly one of appearance.

With regard to paints in general, it may be noted that the really durable paints are those whose basis is white lead. Therefore the lighter in color the paint is, the more lead it

contains, and the more lasting it is likely to prove. The chief exception to this is the well known red lead, which, when genuine, is equally durable. But the color of this precludes its use except as a priming coat on metal work, for which purpose it should be regarded as, on the whole, the most satisfactory material.

FLOOR VARNISHES

The part of the interior woodwork that is likely to give the most trouble is the floor. As has already been suggested, floors should never be painted, because it is quite as impossible to keep a painted floor in good condition as it is to make its looks originally acceptable. A floor should, therefore, if it is not to be entirely covered with a rug, be stained. What are known as water stains usually give a better effect than the oil stains, especially when applied by unskilled hands. By better effect is meant a brighter and more uniform color. When dry, however, they must be thoroughly varnished with at least two coats of some high grade floor varnish such as those previously named. Cheap varnishes are not worth the price of the cans they are sold in, since they will either darken and discolor

the floor, spot with water, scratch, and probably be so sticky that for all time dust will adhere to the floor surface from which it is impossible to remove it.

. The best grades of floor varnish are expensive, but as they are very durable it is not worth while for the amateur to try his or her skill in applying them. If they are once put on by a skilled painter and properly rubbed down between the coats (the last coat having a little wax added to it) the job is done for years to come; and beyond a little occasional touching up with wax, is not likely to require much further attention.

In treating an old floor that has not been stained or varnished it is advisable to have it replaned in order that the bright fresh surface of the wood may show, as old dark stain spots cannot be removed by any other process. It is not of so much importance that the floor should be even in a geometrical sense as that it should be even in color.

All of these processes of course are somewhat expensive and it is therefore advisable in all houses of moderate cost to have only the borders of the rooms so treated, leaving the major portion in the center to be covered by a carpet or a rug.

There are ready-made hardwood floors, which consist of a rather thin layer of wood backed on canvas or some such material which can be bought at reasonable prices and if put down by a skilled carpenter as a border give very satisfactory results. They are finished, of course, in the usual way.

Kitchen floors are difficult to treat if the woodwork is to show, and as has already been suggested it is much the better policy to cover them entirely with linoleum, and be done with it. In the most expensive class of houses the kitchen floor is tiled, but we are not concerned with such matters here.

STAINS

Staining is the cheapest method of treating interior woodwork and, otherwise than on floors, may be regarded as sufficient if the water stain be followed by a coat of pure linseed oil with just sufficient Japan dryer in it to insure its becoming hard.

Almost all of the woods will take stain well, even yellow pine, and these stains need not have regard to the natural color of the wood but may be greens, reds, blues, or any other color which will harmonize with the

color scheme of the room as a whole. Cypress is an excellent wood for such treatment and is very durable both for exterior and interior finish.

A very commendable fashion which is coming in is to stain the exterior woodwork of a house rather than paint it. This gives softer and more agreeable effects and on the whole is probably better for the woodwork itself. Dark browns and greens for the exposed ends of roof rafters, woodwork of the porches and verandahs, etc., give excellent results. Shingles whether on the roofs or the side walls may be left untreated in order that they may acquire a silvery weather stain which is the most beautiful of all. Roofs quickly acquire this but side walls far more slowly and during the process of acquiring it are almost certain to color unevenly making a disagreeable effect which has to be endured sometimes for as long as five or six years.

For this reason it is perhaps more advisable to stain the shingles dipping them for not more than one-third of their length in a shingle stain, of which Cabot's is one that may be generally relied on, though the most durable of all stains is perhaps the creosote stain, which gives on light wood shingles an agreeable brown effect.

On cypress and red-wood shingles the effect is somewhat darker.

The light shingle stains are mixed with less durable pigments, which in the course of time will wash off more or less completely; sometimes the washing off process is a slow one and when complete the shingles will be found to have acquired an agreeable and permanent color though different from that originally intended.

INTERIOR PAINT AND PAPER

Where the walls or woodwork of a house are painted, the most difficult problem which results from this treatment is that of keeping the surfaces clean without repainting. The water paints or fresco colors cannot be washed with water, but stale bread may be used to wipe off serious blemishes. This process may also be used for wall paper. Good oil paint should stand washing with soap and water if it has a decided gloss. If it does not show any gloss it is better to resort to soft artist's rubber for individual spots of small size. If the paint is much defaced nothing of course will serve but repainting. This process has one decided advantage in that it gives us the opportunity of

changing the color scheme of a room if we wish to do so.

Paint which has blistered about a fireplace can be renewed only by sand papering and repainting on the spots affected, although it is better to refinish the whole mantel as it is always difficult to match with new paint old paint which has acquired a certain tone through age.

The hundred and one small repairs that need to be made about a house are usually done by householders who have an aptitude for such work, who will not need any special directions, but for those who have not such aptitude it is cheaper in the end to call in skilled labor to make the repairs as needed, using one's common sense to check the tendency of the average mechanic to do much more work than is really required. Careful attention to these matters will soon enable the householder to form sound judgments and diminish his repair bills considerably.

INDEX

PAGE

Adjoining rooms, how to decorate..... 134
Air space in walls..... 73
Alterations, what to ask for..... 89
"Artistic" furniture..... 129
"Art rugs"..... 128
Art, sins in..... 127
Aspect 47
Austrian house, plans of..... 87
Apartment houses and home life..... 23
Back stairs..... 93
Back yard, that..... 206
"Barberri" hedges..... 193
Basins 181
Bathroom 103
" European 104
" tiles in 143
Bathtubs 179, 181
Beauty, not necessarily an extravagance... 142
Bedrooms 102
"Boiler" (hot water reservoir)..... 93
Brick 72
" walls 65
" " absorbent 59
Brick-work 57
Building Association, The..... 18
Bungalow, plans for a..... 122
Buy carefully..... 24
"Cabot's Preservative" for brick-work.... 60
California privet..... 192

PAGE
Cellar, how to inspect 67
" windows 60
Cement 72
" mortar 57
" walks 65
Cesspools 185
Cheap "homes" 14
Chimneys, smoky 77
City front yard, A 201
City life, advantage 46
Closets, in bedrooms 90
" earth 186
" lights in 91
" water 181
Cold air inlet, The 162
Color and texture 137
" dominant 131
" for dining room 136
" " hall 136
Compression cock 178
Concrete claims 78
" houses 74, 79
Convenience, not size 27
Corner houses most healthful 42
Cost of living 10, 17
Cracks, from settlement 58, 215
" shrinkage 219
" what they mean 58
Decorating adjoining rooms 134
Dignity in a room 130
Dining-room, The 97
" " color for 136
Direct and indirect radiation 106
Distance from work 32
Dominant color 131
Doorbells, how to test 89

PAGE
Doors, how to test 71
Down-spouts 61
Draperies 140
Drains, how to inspect 67
Dry rot 220
Earth closets 186
Electric batteries 91
Evergreen hedges 193
Family, The house to fit the 20
" life 15, 84
Faucets 177
Fireplaces 77
Fireproof houses 75
Fixtures, gas and electric 147
" plumbing 180
Floors, hardwood ready-made 225
" porch 62
" treatment of 138, 143, 144
" upper 111
" varnishes for 223
Flower bed in city 204
" " wrong place for 190
Flower garden 195
Flue, air supply to fireplace 78
Flues, slope of 162
Front yard, city 201
Fuller faucet 178
Furnace, defects of 152
" flues 154, 156
" hot air 149
" how to inspect 67, 163
" placing of 154
Furniture 141
Garden 188
" books on 200
" perennials in 194

PAGE
Garden, plan for 208
" pools 195
" principles for..... 189
" roof 210
" soil, bad 211
" walks 198
Glass in windows..... 65
Grading 65
Gravel walks..... 198
Half-timbered houses..... 73
Hardwood floors..... 144
" " ready-made 225
Heating and Ventilating..... 148
" steam 165
Heat supply, how to test..... 159
Hedges 191
" evergreen 193
" Japanese barberri..... 193
" privet 192
" rose 194
Home and Family Life..... 15
Hose connections.....67, 177
Hot air furnace, The..... 149
Hot water system, The..... 168
House and home..... 14
" " garden 188
" best way to place..... 53
" cost of..... 86
" fifty foot lot..... 119
" how built..... 56
" how to inspect.....66, 213
" inspection systematic..... 214
" interior 66
" narrow city lot..... 85
" refined 127
" site of 86

PAGE
House, suburban 118
" what plan..... 81
Houses, concrete 74, 79
" "Dutch Hall" type..... 83
" fireproof 75
" half-timbered 73
" wood, brick, stone or cement..... 72
How is the house built?..... 56
Income, amount for rent..... 17
Indirect radiation..... 166
Individuality 26
Interior, important details..... 70
Introduction 9
Kitchen, The..... 68
" conveniences 92
" floor, woodwork and fixtures..... 68
" position of..... 95
" tiles in..... 143
Lawn, how to make a 197
Library, The 98
Lighting, devices..... 91
" a room 130
Lights in closets..... 91
Living-room, The..... 98
Lot, The..... 39
Lot, condition of 31
Lot, small, best plans for.....108, 115
Masonry walls..... 61
Metal-work, outside..... 64
Mixing valves..... 179
Moisture in heating..... 160
Moral advantages..... 45
Mortar 57
Mortgage, building on 16
Neighborhood 31, 34
Neighbors 36

PAGE
Noise 36
Ownership, site, cost..... 86
" versus rent..... 16
Paint, cheap..... 221
" importance of lead in.....64, 222
" exterior 63, 221
" interior 227
Pantry, The..... 96
" how to inspect 69
Paper, on walls..... 227
Perennials 194
Pipes, leaky..... 216
Plan, for a small city lot..... 108
" for narrow suburban lot..... 115
Plans, for a bungalow..... 123
Plaster, loose..... 217
Plumbing 175
" fixtures 180
Porches, position of..... 101
Privet, California..... 192
Prospect and Aspect..... 47
Radiation, direct and indirect..... 166
Range, The..... 94
Reception room.....84, 99
" " decoration 135
Refrigerator, proper placing of..... 93
Registers, placing of..... 156
Rent, amount to pay..... 17
Renting or ownership..... 16
Repairs 228
Rich man's troubles, The..... 22
Roof, how to examine 62, 64
Roof-garden 210
Room, dignity in..... 130
" lighting a..... 130
Rooms, position of..... 105

PAGE
Rose hedges 194
Rot, dry 220
Rotting woodwork 219
Shower-baths 179
Shrubs 199
Simplicity 132
Sincerity 29
Sink, in kitchen 93
Sins in art 127
Site, The 31
Slop-sink, The 183
Small lot, best plans 108, 115
Smoke 36
Smoky chimneys 77
Soil-pipe, The 184
Springs 42
Stains 225
Staircase, The 100
Stationary washtubs 92
Steam heating 165
Stitch in time, A 213
Stone 72
Stone houses, disadvantages 73
Stone work not always expensive 76
Street, condition of 31
Suburban house, A narrow 116
Sunshine and view 47
" amount of on walls 50
Texture 137
Town or country? 43
Transportation 31, 33
Treatment of woodwork 146
" " floors 143
" " fireplaces 146
Trees and shrubs 199
Unity 129

PAGE
Upper floors, The 111
Varnishes, floor 223
Ventilating 148, 172
Vines 200, 205
Walks 65, 198
Walls, air space in 73
" cracks in 215
" masonry 61
Washtubs, stationary 92
Water-closets 181
Water, hot, " boiler " for 93
" supply 176
Water-hammer, The 171
Waterproofing bricks 60
What is the plan of the house? 81
What sort of a street? 38
Where shall the house be? 30
Windows, cellar 60
" dormer 72
" fastenings 70
" glass in 65
Winds, prevailing 54
Wooden houses 72
Woodwork, outside 62, 221
" rotting 61, 62, 219
" sound though unpainted 221
" treatment of 146